The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXIII. No. 587 SEPTEMBER 27, 1930 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.4.6

Contents

	PAGE
EDITORIAL: Our Eleventh Autumn Annual; Some Chemical Thoughts on Chimneys; A Great Chemical Enterprise..	269
Distillers Company's Great Enterprise at Hull	271
Correspondence: A British Association Century Fund; Commercial Use of Anhydrite	277
Packing of Chemicals for Overseas	278
Conditions of Trade in Canada	280
European Sulphuric Acid Industry	281
Chemical and Allied Industries of Yorkshire, by Rex Furness..	282
Yorkshire Chemical Firms and Their Products	284
Yorkshire Technical Colleges	288
From Week to Week	290
Patent Literature	291
Weekly Prices and Market Reports	294
Company News	300
Commercial Intelligence; New Companies Registered	302

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Our Eleventh Autumn Annual

THE present issue of THE CHEMICAL AGE, the eleventh of our Autumn Annual Numbers, has an interest from several points of view. In spite of the talk of trade depression, it carries some ten pages more of chemical trade announcements than the corresponding issue of last year. This points to an underlying confidence in the future that needs to be generally encouraged, and would, if it pervaded every industry, be the best possible tonic that could be applied. As an example of industrial chemical enterprise, the great works constructed by the Distillers Co. for the production of acetone, acetic acid, and other products of immense importance to the solvents industry, show what resources this country possesses and what achievements it is still capable of when it cares to make the effort. This, of course, is a new Yorkshire enterprise, but a glance at Mr. Rex Furness's article in our Yorkshire section this week and at the notices of the many chemical activities in the county will suffice to show what an important factor Yorkshire is in the industrial chemistry field.

As to overseas trade, the Board of Trade figures for some time past have been rather disappointing, but the best judges are confident that the lowest point of the curve has been reached, and that a movement for the better is not far off. It may, indeed, come sooner than is expected, and wisely our principal chemical concerns are maintaining their organisations to meet the increased demand when it sets in. The present world-wide stagnation has come about without any very specific causes. It has just descended on every industrial nation. It may disappear in much the same way. In the meantime everyone will help by maintaining an attitude of quiet confidence, and keeping their business machinery up to the highest level of efficiency.

Our many readers in overseas markets will find in this issue a representative list of what chemical firms in this country are producing for export markets. As compared with many other industries, the chemical industry stands well in the amount and value of its exports, which are roughly double the value of its imports. In some cases the propaganda and sales organisation is as good as probably any country possesses. This, however, cannot be said to be universal. There are still firms that somehow expect trade to reach them without much effort on their own part, and in difficult times these must expect to suffer most.

We still regularly receive inquiries from consumers anxious to get in touch with manufacturers of particular products, but unable to find the names and addresses of the manufacturing firms. This points to some weakness in publicity, which fails to bring goods to the notice of the people who need them. Two instances which have occurred this week illustrate the point. One well-known concern, whose purchases in the course of the year must represent a very large sum, desires to be informed of the name of the manufacturers or, alternatively, of their London agents of "Lurgi" activated carbon for use in gas absorption plants. Another firm sends an inquiry about cast-iron manhole covers for earthenware vessels, the covers being clamped over the vessel manhole or top inlet, and replacing the ordinary wooden covers previously used. The only indication the inquirers have as to the makers is the name "Lewis's system" on the top of the cast iron covers. Many other examples could be cited of business lost through failure to make useful products better known.

All this amounts to another reminder that, however good British goods may be, it is unfair to expect them to sell themselves. It should be the maker's job to see that his products are known to every potential user. Too often, as in the cases quoted, the user has to find out the maker. One can understand, in such circumstances, how easily business is missed by the firm that neglects publicity and passes to rival, possibly foreign, firms that pay greater heed to the convenience and wants of the consumer.

Some Chemical Thoughts on Chimneys

In the days when agriculture was the national occupation man built spires and church towers to ornament the landscape. With the coming of the industrial age, these have been replaced by chimneys seen as scars and blots on the countryside, yet withal visible tokens of the local and national prosperity. Chimneys squat, chimneys round, chimneys tall and even graceful, they climb ever higher towards the sky as the duty imposed on them is increased. Chimneys of brick, chimneys of steel, though these latter are regarded as but alien intruders by the exclusive fellowship of edifices reared brick by brick by the hand of the craftsman. Standing on the pavement like Plato, we have been considering all things and examining into them one at a time. Why not discuss bricks, since chimneys are built of them?

The brick industry has an antiquity of 6,000 years; many are the difficulties it has overcome, for clay is a peculiar and a variable material far more sensitive to delicate chemical and physical influences than the uninitiated would credit The chemist is only beginning to make himself felt in the brick industry; there is ample scope for his investigations, both in the improvement of the actual process and in the study of the real inwardness of the raw materials. The moulding, the drying, the kilning of bricks, the use of the waste heat have all been tackled. The preliminary drying and grinding of the raw clays promises important results.

What a lot of kinds of bricks there are. Besides those from plastic materials, from which we build houses, bricks can be made from sand, slaked lime, and water, a process in which there is a chemical reaction, but which requires a good deal of care and the observance of accurate conditions. Bricks are made from slag and lime, but woe betide unless the slag is adequately graded and the lime properly slaked. Science has been let loose on the problems of concrete bricks, and there is learned talk on the grading of the aggregate, the optimum proportion of water, the use of rapid hardening cement and keeping the bricks saturated with water for at least a week after they have been made. With silica fire bricks the chemist really comes into his own. For both lime and clay bonded bricks very pure silica is required. The improvements of the last twenty years are admittedly almost wholly the result of careful scientific research, much of it of a wholly academic character. The importance of using those forms of silica which are most easily converted into cristobalite and tridymite is appreciated, as also the heating under such conditions that the maximum conversion commercially attainable is reached.

Bricks upon bricks! For there are also those made of magnesite, of carborundum (which have a much greater thermal conductivity than other equally refractory materials), of zirconia, of sillamite, to choose from. Our meditations have brought to light strenuous activities by chemists and we gaze upwards at the chimneys with new respect. Even they are not the simple smoke emitters of the past, for the chemist has fitted them with gadgets analogous to what the house agent picturesquely describes as the "usual offices," namely, "CO_2 recorders," dust separators, etc. Before long, no doubt, the equivalent of the household bath, viz., an "SO_2 washer" will also be obligatory.

A Great Chemical Enterprise

Even a cursory study of the account published for the first time in this issue of the Distillers Company's new solvents works near Hull will convince the reader that it is one of the most notable chemical enterprises of recent years in this country. Here is a corporation, long versed in the old science which may also be described as the art of fermentation of potable spirit, branching out into the newer field of industrial alcohols and already, within the short space of two years, producing immense quantities of acetone, butanol, acetic acid, etc., as raw materials for industry. Hitherto we have had to depend for our supplies of these essential solvents on Germany and Canada (Shawinigan). Now at Hull, this country has its own supplies. The works employ some 500 men continuously; their erection has employed large numbers of workmen and absorbed immense quantities of constructional material. At a time when industry needs all the help it can get, the enterprise of the Distillers Company has brought into existence works of really national interest from the points of view of employment and of home production of industrial necessaries. For the moment, we are informed, the market for these products is affected by uncertainty as to the policy of the Government in such matters as the duties on silk. Without regard to any mere political theories, one can claim that enterprises of this kind, employing home labour and supplying essential home needs, are entitled to the fullest encouragement and support that can be given.

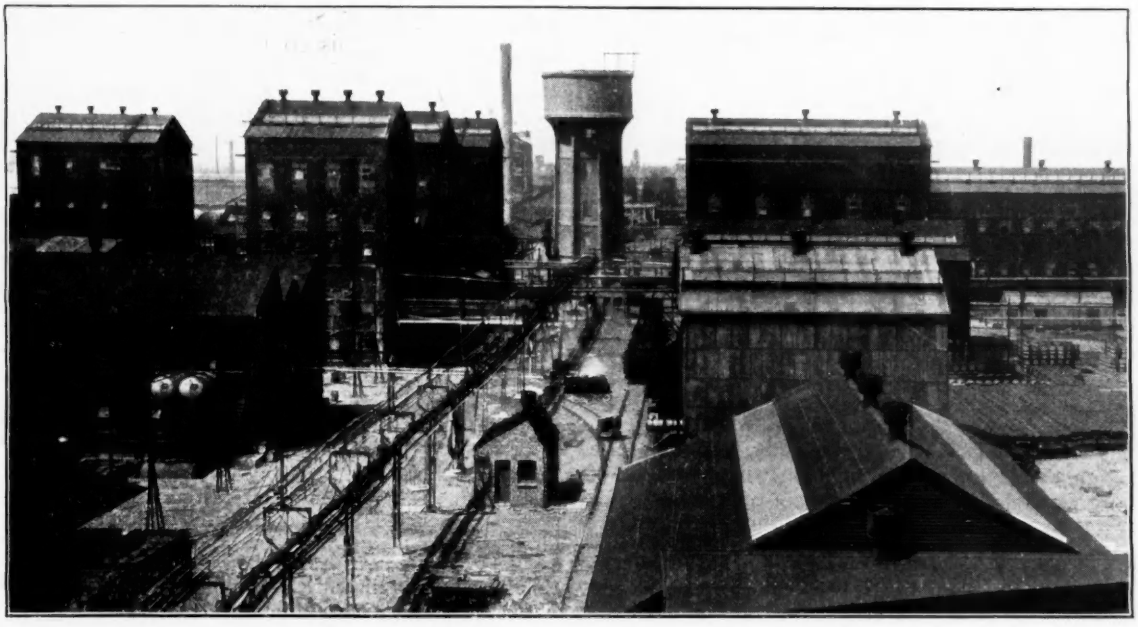
As a chemical and engineering achievement, no less than for their commercial importance, the works at Hull are of great interest. While the older fermentation processes are still employed—in the vinegar factory nearly a thousand acetifiers are used to convert alcohol to vinegar—in the industrial solvents plant a synthetic process, developed in the laboratories of H.I.A.G. Holzverkohlungs-Industrie G.m.b.H., of Konstanz, has been applied on the large commercial scale with remarkable skill and success. From every point of view the enterprise may be viewed with genuine pride, and merits the commercial success that, with reasonable support and favourable conditions, there is every ground to expect.

The Calendar

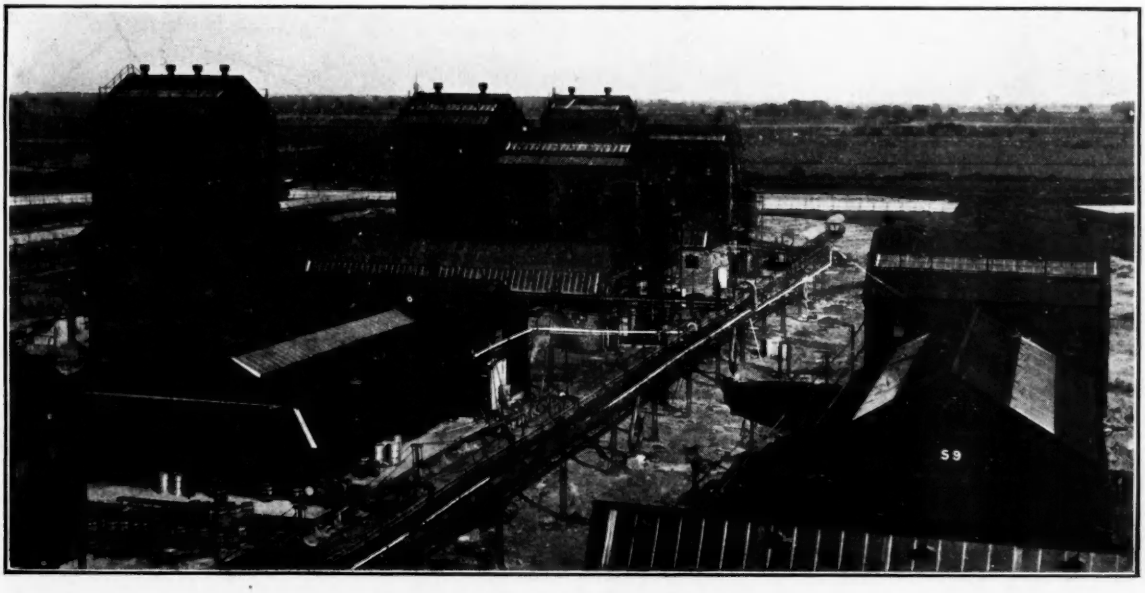
Sep. 29 to Oct. 1	Faraday Society: General Discussion: "Colloid Science Applied to Biology."	The Laboratory of Physical Chemistry, Free School Lane, Cambridge.
1	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
2	Society of Chemical Industry (Bristol Section): "Air and Water." Professor J. W. Hinchley. 7.30 p.m.	University, Bristol.
6	Iron and Steel Institute: Additional Autumn Meeting. 7.30 p.m.	Cleveland Technical Institute, Middlesbrough.
7	Iron and Steel Institute: Additional Autumn Meeting. 7.30 p.m	Metallurgical Club, Sheffield.
7	Iron and Steel Institute: Additional Autumn Meeting. 7 p.m.	Secondary Schools, Doncaster Road, Scunthorpe.

Distillers' New Industrial Solvents Plant

Below are reproduced, from specially taken photographs, two views of the new works erected near Hull for British Industrial Solvents, Ltd. A descriptive article on this important enterprise, together with further illustrations, appears on the next and following pages (pp. 272-6).



ACETALDEHYDE AND ACETONE SECTIONS, WITH WATER TOWER IN CENTRE.



GENERAL VIEW OF ACETIC ACID SECTION.

Distillers Co.'s Great Enterprise at Hull

New Plant for Production of Industrial Solvents

In the following article, an account is given for the first time of an enterprise of the highest chemical and industrial importance, undertaken by the Distillers Co., Ltd. Comprising a distillery, vinegar factory and solvents plant, the works are already very large, but extensions are now in progress that will greatly add to their size and productive capacity. The scheme is one of the greatest chemical projects undertaken in this country in recent years, and, carried out within the short period of two years, represents a remarkable achievement in which chemistry engineering and commercial control have co-operated in perfect unison.

In an account, published in The Chemical Age just over two years ago, of the splendidly equipped new research instituteestablished at Great Burgh, Epsom, by the Distillers Company, it was intimated that the company contemplated an early entry into chemical industry as manufacturers of industrial alcohol products, such as acetone, acetic acid and butanol, high grade esters, and a wide range of solvents and plasticisers for use in the preparation of cellulose lacquers. In addition to the fermentation processes with which the company has a long traditional association, it was further suggested that synthetic processes, involving catalytic treatment and high pressure methods, might be employed on a large scale.

Within the short period of two years, these ideas have been converted into commercial practice on a scale so large as to be almost incredible. At Saltend, about five miles out of Hull, on an extensive site occupying some 45 acres on the Humber banks, a series of great works have been brought into existence which are already producing on a large commercial scale and which are still in process of being enlarged by the construction of additional plant. What was some two years ago a tract of unoccupied riverside land is to-day a great colony of chemical works where there has been developed an important industry for the production of British industrial solvents, conceived and planned with boldness and faith in the future, and designed to supply this country with what seems to be inexhaustible supplies of essential materials for old and new industries. Already the works rank among the great British chemical enterprises of this decade, and scarcely any limit can be placed on their importance for the future.

The General Scheme

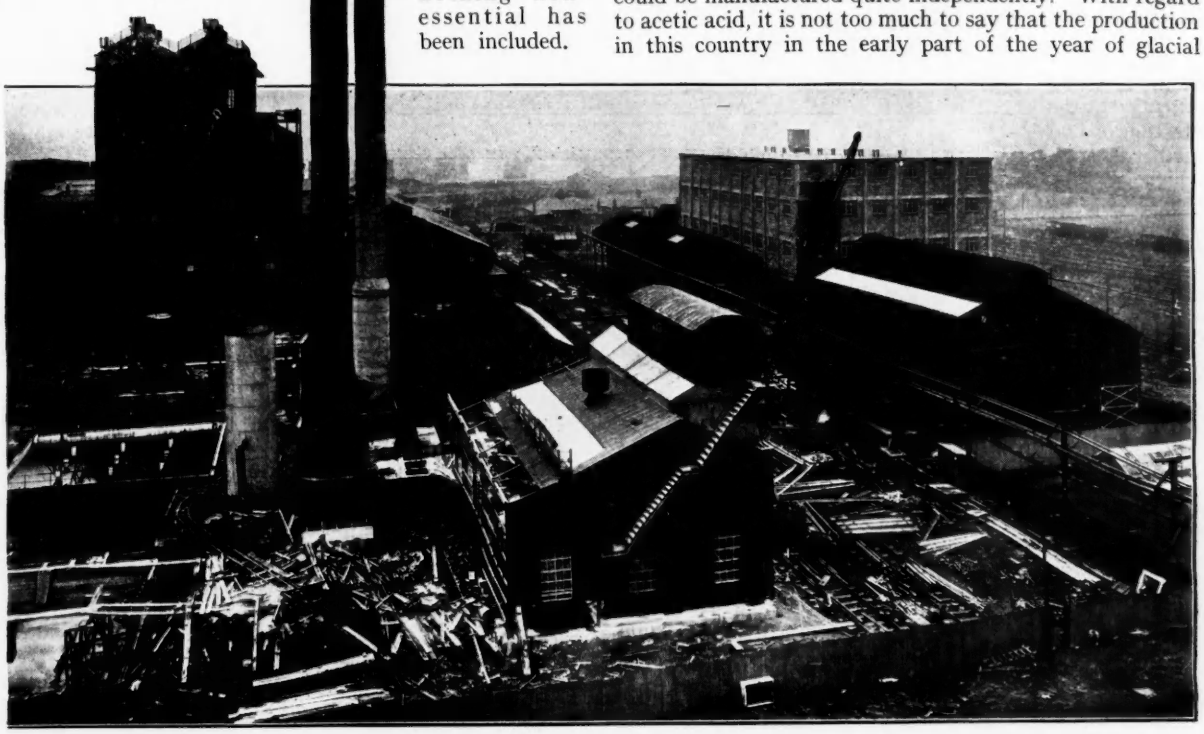
Before going into details, it may be briefly explained that the operations fall into three sections, each independent and yet intimately associated, all under unified control and governed by a central purpose. The oldest section contains the works of the Hull Distillery Company, which produces immense quantities of alcohol from molasses. The supply of molasses comes by tanker mainly from Java to the works pier, is pumped direct into tanks in the works and undergoes the normal fermentation and usual distillation processes by which the practically pure spirit is recovered. This industrial alcohol, conforming to specifications regarding purity, is passed as the raw material into the other two sections. The first of these is the immense vinegar factory owned by the Distillers Company, Limited. This comprises nearly a thousand acetifiers wherein the biological process of converting alcohol to vinegar is carried out under the most modern and most hygienic conditions. The other, and in some ways the most interesting chemically, is the newly constructed plant of British Industrial Solvents, Limited, a company in which the Distillers Company, Limited, have in partnership the well-known firm H.I.A.G. Holzverkohlungs-Industrie G.m.b.H. of Konstanz, in whose laboratories these processes have been evolved and elaborated. In one section of the company's works the alcohol, after being denatured, is converted into acetone. In another it is oxidised to acetaldehyde, which serves as

A General Photographic View of the—

an intermediate for the production in one direction of crotonaldehyde, leading to crude and finished butanol, and in another of first crude and then finished acetic acid. These, of course, are highly technical synthetic processes which, ingenious and effective as they are, present a striking contrast to the simplicity and naturalness of the older biological or fermentation processes, which proceed silently and without apparent effort in the vinegar works almost alongside.

Considering the short period which has been occupied in the design and construction of the works, the progress is amazing and is a striking testimony to the skill and courage of the engineering section of both partners in the enterprise. Equally impressive is the accuracy with which every need has been foreseen and provided for. Communication is easy whether by water or road or rail. Lines of railway surround and intersect the various offices and buildings, so that incoming material can be unloaded at the point where it is required and finished products shipped direct into railway wagons for despatch. The whole plan makes an excellent study in modern works layout.

The buildings, for works of this class, are unusually light and airy, owing to the introduction of metal grid flooring and wide window space and ventilation. The plant is so arranged that effective control in each building is possible with a minimum of labour. Beside each sectional unit is the appropriate laboratory where problems incidental to the particular unit can be specially dealt with. The accommodation for the office and technical staffs are of the most modern type, supplying the essential conditions of health and comfort without any extravagance or fussiness. Canteens, baths and even bedrooms for emergency conditions are provided for the use of the staff. If one sought any single phrase to sum up the spirit of the enterprise, it would be the simple slogan, "Fitness for purpose." Nothing essential seems lacking; nothing non-essential has been included.



—Distillery Plant, with the Vinegar Factory shown on the right.

Planning for a Great Future

It will be realised from what has been said that the Distillers Company, with their great resources of experience and finance, are planning for a great future. It would be useless entering on this field in any other spirit. Wisely, they see the possibilities of the solvents industry in the future, the part that the alcohols seem destined to play in industry, and are preparing to meet them on an adequate scale. They are making a bold bid to become pioneers in industrial aliphatic synthesis, a field which in many respects has been neglected in this country. They have selected an almost virgin district, in which a few large oil companies have already established works and which promises to become ultimately one of the great oil supply centres of the country. Behind the whole enterprise are the resources of a first-rate central chemical research institute, by means of which the problems that arise in the course of the works, especially in the earlier stages of operating new plant and new processes, can be promptly investigated, and a complete liaison between researcher, works chemist and works manager constantly maintained. So well designed, planned and operated, however, has the whole scheme been that the problems arising have been mainly of an incidental, rather than fundamental, character, and the work has proceeded to successful commercial production with an astonishing absence of serious difficulty, with no striking instance of miscalculation, and with very few cases in which things could have been better done than they have actually been.

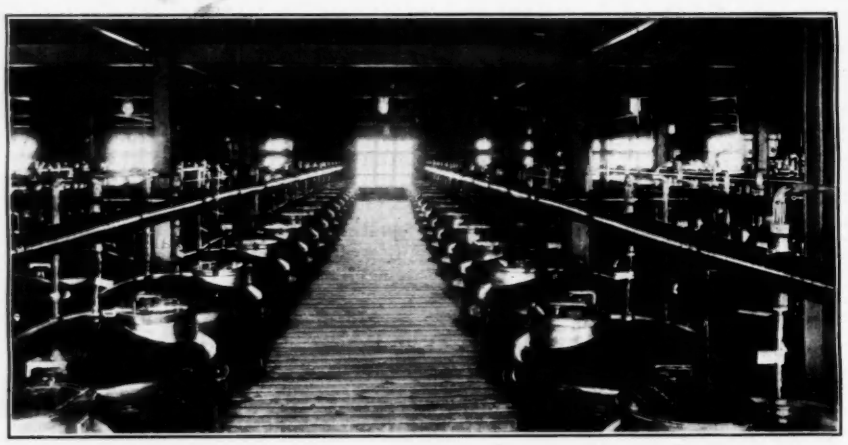
A very large sum indeed has been expended during the past two years in labour and in plant and equipment in an endeavour to produce in this country substances such as acetone, butanol and glacial acetic acid for the home market, all of which had hitherto been imported. Some four years ago the Distillers Company commenced the manufacture of acetone and butanol by fermentation processes at Kings Lynn, but after a disastrous fire they decided upon other methods of manufacture by which these substances could be manufactured quite independently. With regard to acetic acid, it is not too much to say that the production in this country in the early part of the year of glacial

acetic acid of the highest quality on a continuous commercial scale constitutes an historical event of the very greatest importance. It is impossible to say where this kind of enterprise will lead. Catalytic processes are revolutionising chemical manufacture. Taking into account the production at their Carshalton Works where, for the most part, esters are manufactured, British Industrial Solvents are already manufacturing an important range of products the details of which are to be seen in the usual trade notices. With considerable quantities of a variety of by-products coming from their present manufacturing process the range of commodities made will undoubtedly soon be increased.

From these general considerations one may now proceed to approach the enterprise more in detail.

The Distillery

The raw material used is almost entirely cane molasses, principally Javan. A storage capacity of 57,000 tons is provided and an entire shipload of 12,000 tons can be discharged in about 60 hours. The present fermentation plant consists of a battery of twelve fermenters, each with a working capacity of 75,000 gallons. This is, however, being increased by the erection of twelve new fermenters. The fermenters take their inoculation yeast from a pure yeast culture plant so that pure strains of the most suitable yeast can be used. The existing distillation plant is housed in a new still house over 100 ft. high, and consists at present of three stills giving in all some 150,000 gallons proof spirit per week. This installation is being extended by the erection of two further stills which will bring the capacity up to 250,000 gallons proof per week. These stills are adapted for turning out both high strength and low strength spirit.



GENERATOR FLOOR, SHOWING SOME OF THE 960 GENERATORS.

At this distillery there is also a large denaturing and methylating section, where the spirit is denatured under excise supervision. It is stated that the Distillers Company, one way and another, are among the few large users of wood naphtha and of synthetic methanol in the country.

Vinegar Factory

The unit acetifier or converter upon which this factory is based is of the most modern type, and consists of an earthenware tower packed with beech shavings, with a very ingenious mechanical device for spraying the dilute alcohol-nutrient mixture in definite quantities at definite intervals. The whole of this arrangement is controlled electrically from a central master clock. Of course, there is the necessary human control to take care of fluctuating weather conditions, but, in the main, the operations are almost entirely automatic. This unit is duplicated 960 times. The whole plant is a marvel of system and cleanliness. To stand amid so vast and so silent a biological activity, where the alcohol molecule is being oxidised to acetic acid in low concentration, provides a striking contrast with the great expenditure of energy, the fuss and the cost of carrying out precisely similar processes at high concentration not far away by British Industrial Solvents. It is claimed that vinegar prepared in this way is much purer and more regular in composition than that produced in the usual way adopted in this country, and has the characteristic of milder flavour. The vinegar as produced contains about 10 per cent. of acetic acid and is either dispatched at that strength or reduced as desired. This natural fermentation vinegar has been shown to possess as high a vitamin value as that produced from grain and to be in every respect a high grade diatetic product.

Solvents Factory

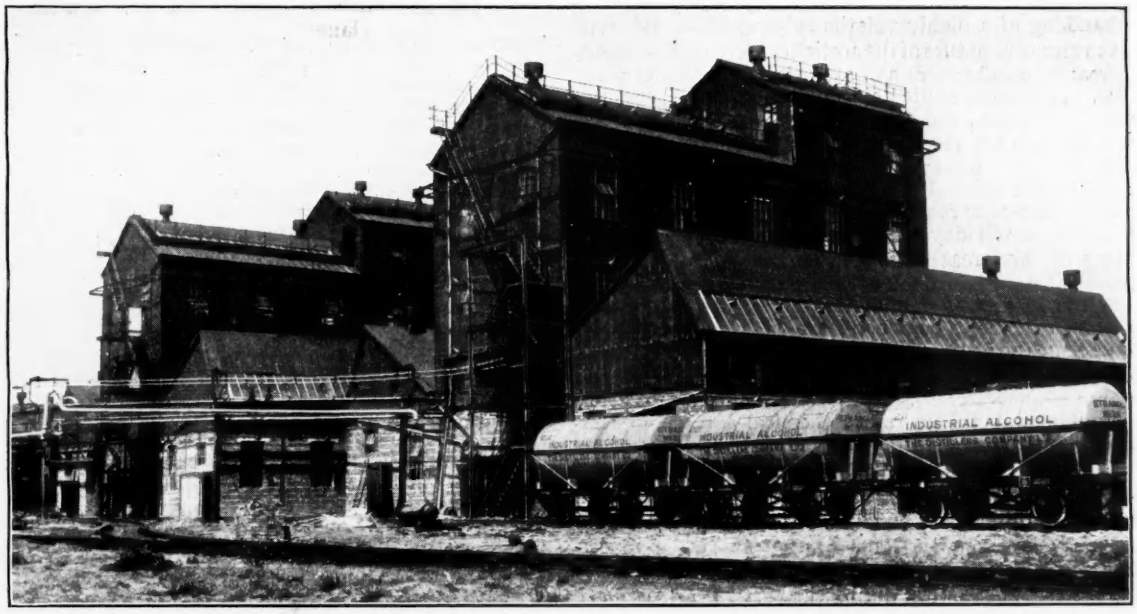
In many ways this is the most notable of the developments at Hull. The first section of the works is designed to produce acetone directly from alcohol by a catalytic process. Alcohol vapour and steam are passed over a composite promoter, or catalyst, at a dull red heat. The resulting vapours contain chiefly acetone, hydrogen and excess steam and alcohol. There are very few by-products, and the vapours, after condensation to separate the hydrogen, are fractionated to give a very high grade acetone and some alcohol, which is returned to the cycle of operations. At the time of visiting the factory there were 5 furnaces in operation, each capable of producing 500 tons of acetone per annum, and further extensions were in progress to meet the increasing demand and to provide a margin. The yields are extremely good and the process works smoothly and efficiently. These results are, however, only obtained by rigid control at every part of the process. The acetone plant is a fine example of modern factory organisation and is at present capable of producing about 3,000 tons per annum. Besides producing acetone, the by-product hydrogen is of great importance and is used in the next described operation.

Butyl Alcohol

The synthesis of butyl alcohol is carried out by first oxidising alcohol to acetaldehyde, condensing the aldehyde to aldol, dehydrating the aldol to crotonaldehyde, and reducing the crotonaldehyde to butyl alcohol.

The first operation consists in mixing alcohol vapour with air and passing the mixture over a silver gauze catalyst under very rigidly controlled conditions of temperature, rate of flow, composition of vapours, etc. Once the catalyst chambers are working, they maintain their temperature by reason of the heat which is disengaged in the change. Extremely good yields are obtained and the next operation is to fractionate the vapours into pure aldehyde and excess alcohol, which is returned to process.

The aldehyde so obtained is then condensed by means of caustic alkali to aldol. To see carried out on a large scale a condensation process of this kind, which is usually associated with glass apparatus, is a matter of considerable interest. The aldol, on steam distillation, breaks down to



Nos. 1 and 2 Crude Acetic Acid Buildings.

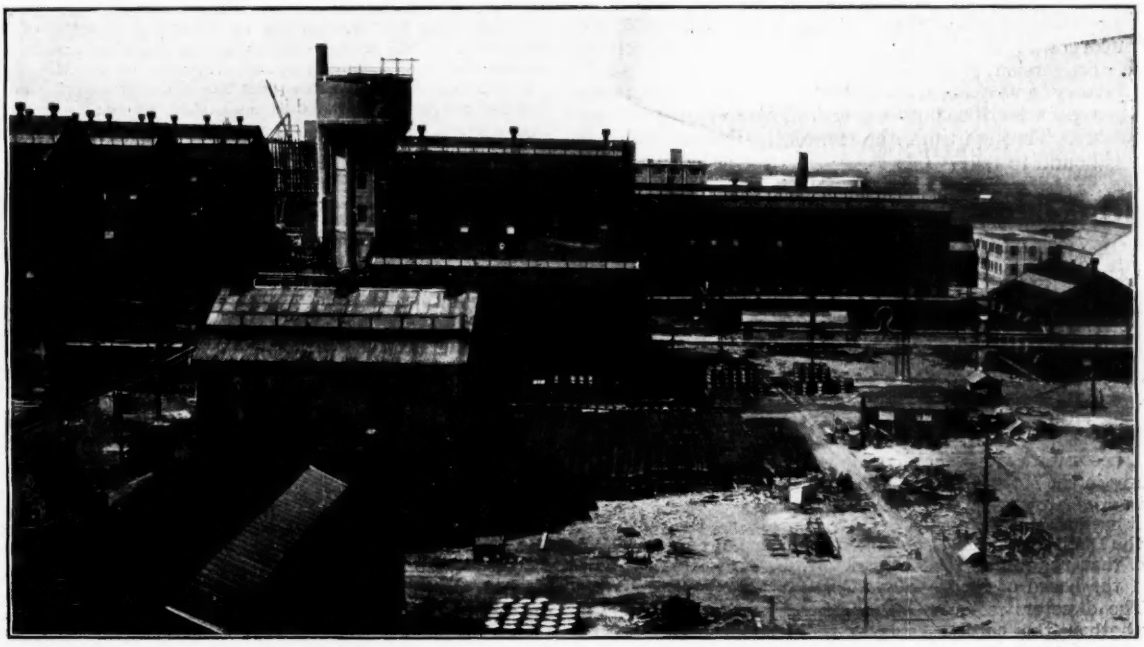
crotonaldehyde, the vapour of which mixes with the excess hydrogen from the acetone plant and passes over a special catalyst, giving crude butyl alcohol, which, in turn, is fractionally distilled to obtain the pure product.

The butyl alcohol produced by this process, as distinct from the usual synthetic process, is the normal product and not the isobutyl alcohol. It compares therefore with the well-known fermentation product which the Distillers Company, Ltd., produced for a time at Kings Lynn. The present plant is capable of producing at the rate of 1,500 tons of finished butanol per annum.

The plan followed in all these processes is to employ a large number of comparatively small catalytic units rather than a small number of large units. The initial cost is possibly higher, but the flexibility which is thereby assured and the better continuity of the process which follows is held to be adequate compensation.

Acetic Acid

A part only of the aldehyde produced in the aldehyde section is used for the butyl alcohol manufacture; the remainder goes to the acetic acid plant. This is capable of making 10,000 tons of glacial acid per annum when fully operated. The process itself is a simple one, merely the oxidation of acetaldehyde to acetic acid. The acetaldehyde is oxidised in specially designed kettles by means of air, and the rest of the plant consists of scrubbing towers and



The Acetone Section.

condensing apparatus. Although the process is simple, the handling of a highly volatile substance like aldehyde and the corrosive nature of the acetic acid produced demands the greatest possible care and attention to details of plant design. The crude acetic acid produced has a strength of about 95 per cent., and contains only traces of impurities. This is sent to the rectifying department, where a glacial acid is produced of the very highest quality. As in the case of acetone and butanol, the glacial acid is sent out in tank wagons or drums as required.

Although a full day was spent in visiting the various sections of this great enterprise at Hull, only a general impression could be gained of what had been achieved in the matter of process detail. The magnitude of the task was brought home to one upon learning that, for example, in one comparatively small section, there had been fitted more than four miles of pipe lines of various sizes and upwards of 400 valves. Similarly one can only appreciate in a general way the enormous chemical and engineering difficulties which had to be overcome by all parties concerned in this work. Cooling water had to be brought some two miles from the sea, and high buildings, carrying considerable weights, had to be built on very insecure ground.

Constructional Statistics

The following list of materials used in the Solvents Section alone in the work during the past 18 months gives an idea of the human energy which has been expended :—

Ground excavated	39,500 cubic yards
Concrete used	15,000 ,, ,,
Filling material	59,000 ,, ,,
Portland cement	3,000 tons
Steel reinforcement	350 ,,
Structural steel	2,010 ,,
Corrugated sheeting	5 acres
Railway track laid	1¾ miles
Roads constructed	750 yards
Underground pipes laid	2¾ miles
Field drains and sewers	4¾ ,,
Electric cables	Over 7 miles
Buildings erected	37
Total floor area	6 acres
Overhead pipes	24½ miles
Number of valves and cocks	5,900
Wiring in conduit	28 miles
Electric motors	180
Electric lights	1,000
Men employed continuously	500

By starting from the ground, however, it has been possible to incorporate all that is modern in power production, power conversion, plant design and process control. To-day the factory is working with remarkable regularity, thanks to the rigid scientific control exercised at every part of the processes. Through time, the cumulative benefit from all this is bound to tell.

United Molasses and Distillers Co.

Exchange of Shares

In consequence of reduced profits the United Molasses Co., in order to conserve its resources, have decided not to pay any interim dividend. The financial position of the company, however, is described as " one of great strength."

An arrangement has been concluded with the Distillers Co., Ltd., of Edinburgh, for an exchange of shares in the Molasses Co. for shares in the Distillers Co., at the rate of two United Molasses Co., fully-paid ordinary shares for one fully-paid ordinary share of the Distillers Co., Ltd. This arrangement will necessitate the issue of an additional 375,000 ordinary shares in the Molasses Co., making a total issue of ordinary paid-up share capital of the company of £4,851,251.

It has further been agreed that Mr. W. H. Ross, the chairman of the Distillers Co., Ltd., shall join the board of the company, and that the Molasses chairman, Mr. F. K. Kielberg, shall join the board of the Distillers Co.

The directors feel that these arrangements will not only strengthen the cordial business relations already existing between the two companies, but will prove of great advantage.

Death of Professor H. B. Dixon

Professor H. B. Dixon, of Manchester University, was taken ill suddenly and died at Lytham railway station last week. Professor Dixon was born on August 11, 1852, the second son of William Hepworth Dixon, editor of the *Athenæum*. From Westminster School he went up to Christ Church, Oxford, as a junior student, and studied chemistry under Mr. A. G. Vernon Harcourt. After taking a first class in the Natural Science School in 1875, be became assistant to Mr. Vernon Harcourt, and began his researches into the reactions of pure gases. In 1879 he was appointed Millard lecturer at Trinity College and in 1881 Bedford lecturer at Balliol College. In 1880-81 Mr. Dixon experimented for the Board of Trade on standards of light to be used in photometry, and in 1884-85 he made photometric determinations of various illuminants at the experimental lighthouses erected by Trinity House at South Foreland. In 1886 he was elected a Fellow of Balliol, but not long afterwards was chosen to succeed Sir Henry Roscoe as Professor of Chemistry at Owens College, afterwards the University of Manchester, and retained the chair until 1922, when he retired as Honorary Professor. In the work of the University he took an active part, being successively chairman of the General Board of Studies, Dean of the Faculty of Science, and Pro-Vice-Chancellor. He was also chairman of the Royal Technical Institute, Salford, since 1916, and chairman of the Salford Higher Education Committee since 1919.

As a scientific investigator, Professor Dixon was known as the author of a long series of researches, extending over nearly half a century, on the explosive combustion of gases, the propagation of explosions and the velocity of the explosion wave and of sound in them, and the influence of water-vapour upon gas reactions. He was a member of the Royal Commission on Explosions of Coal Dust in Mines, 1891-94, the Royal Commision on Coal Supplies, 1902–05, and the Home Office Executive Committee on Explosions in Mines (1911-14), and at an early date he urged the necessity of making trials on a working scale, such as were initiated by the Mining Association at Altofts and continued under Government auspices at Eskmeals and later at Buxton, to investigate the nature of the waves set up in dust explosions. He was President of the Chemistry Section of the British Association at the Oxford meeting of 1894, of the Manchester Literary and Philosophical Society in 1907-9, and again in 1923-25, and of the Chemical Society in 1909-11. In 1886 he was elected F.R.S., and in 1913 received a Royal Medal from the society, before which he delivered the Bakerian Lecture in 1893, when his subject was the rate of explosion in gases. He also served on the Council of the Royal Society.

During the war he served as deputy inspector of high explosives for the Manchester area, and was also a member of the Alcohol Fuel Committee, and chairman of the Ministry of Labour Selective Committee for the North-Western District. For his services he was created C.B.E. in 1918. Professor Dixon was a D.Sc. of Manchester and a Ph.D. of Prague.

Cleveland High Explosive Enterprise

Burton Explosives, Inc., with headquarters at Cleveland, Ohio, announces the start of the construction of a new high explosive manufacturing plant at New Castle, Pa. The site of 418 acres is being provided with a high explosives and heavy chemical manufacturing unit. Initial production of ammonia, nitroglycerin, and gelatin dynamites will be 12,000,000 lb. in 1931. Nitric acid and nitrate of ammonia will be produced, and further development in the chemical field is projected.

Mr. J. S. Burton, formerly president of the Grasselli Powder Co., and previous to that managing director of the American High Explosive Co., the Burton-Richards Co., makers of T.N.T., and the Burton Powder Co., will be president and general manager. Mr. A. Stanley Fox will have complete charge of the laboratory and chemical control. Mr. Fox's previous experience dates back to his association with the Nobel interests in England. He was invited to America by the Aetna Powder Co., which is now included in the Wilmington group of explosive manufacturers. Later Mr. Fox became associated with Mr. J. S. Burton in the Grasselli Powder Co., and the du Pont Co.

Commercial Use of Anhydrite

To the Editor of THE CHEMICAL AGE.

SIR,—There have been one or two references in the technical press to the commercial use of the mineral anhydrite, and I note your reference to this subject on August 23, 1930.

I thought it would perhaps be unsatisfactory, from the point of view of initiative shown in this country, not to place on record that this subject has been actively pursued in England for a number of years. It is five or six years ago since I first succeeded in making a practicable plaster from anhydrite. Patents were taken out and during the ensuing years the material was proved as a commercial plaster in certain London buildings, showing its valuable properties in use, and in the various methods of application common to the plastering art.

A wide range of anhydrites from different parts of the world have been examined in this work, and the practical applications were made with mineral from the Durham deposits. The commercial exploitation of these processes is now taking definite shape, and it would perhaps not be an exaggeration to say that a new industry will be developed from this hitherto relatively useless mineral.—Yours, etc.,

V. LEFEBURE.

Sunbury, West Heath Road, N.W.3,
September 24.

A British Association Century Fund

To the Editor of THE CHEMICAL AGE.

SIR,—The British Association for the Advancement of Science has recently concluded a most successful meeting at Bristol, at which discussion has taken place as to the arrangements for the Centenary Meeting, to be held in London, with the gracious approval of H.M. the King, patron of the Association, and under the presidency of General Smuts.

The Association during its first century of existence may claim to have established itself, first as a national and more lately as an imperial institution. Its council is of opinion that, despite the steady support which it receives from its members, and the generosity of certain individual benefactors, and of those home cities or dominions which from time to time entertain it for its annual meetings, the power the Association has acquired for the advancement of science might be far more effectively exercised if it possessed a larger endowment. The council would be loth to risk narrowing the present wide field of membership, and therefore of interest and usefulness, by increasing the subscription for the annual meeting, though that still remains at the figure of £1, at which it was fixed in 1831, and has even been recently reduced to half that sum for junior student members. The council has therefore decided to appeal for a Centenary Fund of £40,000.

A first charge upon that fund or the income from it must be the expenditure appropriate to the fitting celebration of the centenary itself. In this connection it is the object of the council to make the centenary meeting an occasion for the gathering of the largest possible representative body of scientific workers from the dominions, and by this means to repay something of the debt which the Association owes to those dominions whose hospitality its members have enjoyed.

Beyond this immediate object the Association earnestly desires to maintain and extend its annual financial support of scientific research, to discharge fittingly the trusteeship of Darwin's house at Downe, recently entrusted to it in custody for the nation and indeed for the civilised world, and to assure the means of carrying out its Imperial responsibilities. Its financial constitution has always forced it to live in a measure from hand to mouth.

The contributions towards research from the funds of the Association fluctuate annually with its net balance of receipts over expenditure, and it is therefore often a matter of chance whether the Association is able to support any particular research in accordance with its intrinsic importance. Not infrequently the Association has to count the cost, with two much appearance of parsimony, before accepting an invitation to a particular place, having regard to the prospects of local support, or to the distance and expense involved for members who attend. Where the Association is summoned to carry on its public mission, there the council feels that it should be able to go without question or limitation on financial grounds.

Those who serve the Association by contributing to its programme, carrying out its researches and organising its reception at successive places of meeting, do so voluntarily, and it has been said that to voluntary service in the interests of science the whole story of the British Association stands as one great memorial. The object of the present appeal is to strengthen the organisation which makes use of that service.

Contributions to the Centenary Fund will be gratefully acknowledged by the General Treasurer, British Association, Burlington House, London, W.1, and it is competent for donors to hypothecate their contributions, if they so desire, for research in any particular department of science, or for any of the objects which have been indicated above.—We are, etc.,

F. O. BOWER, President.
J. C. STAMP, Hon. General Treasurer.
JOHN L. MYRES, F. J. M. STRATTON, Hon. General Secretaries.
O. J. R. HOWARTH, Secretary.

Burlington House, W.1.
September 22.

Glass Industry Convention

British Manufacturers' "Inferiority Complex"

MR. W. L. CHARICE, in his presidential address at the second Convention of the Glass Industry at Buxton on Thursday, September 18, referred to the "inferiority complex" of many British manufacturers, and said not only did they feel a conviction that they could not compete successfully for such business, but they actually seemed quite resigned to this situation, and would not even take the trouble to investigate the possibilities. This was a mistaken policy, indicating a lack of imagination and initiative. Under anything like normal trade conditions, there was a potential outlet for many varieties of British manufactured goods which were not yet sold abroad merely because overseas buyers did not know that they were obtainable.

"We have to-day a Government which, on the one hand, seems bent on continually increasing the burdens on industry, while on the other hand it utterly refuses to stem the enormous influx of goods produced by very cheap foreign labour," he declared. "It must follow that, unless this state of affairs is altered, British manufacturers will either have to reduce wages to the foreign level or go out of business, which would mean adding millions to the unemployed and reducing unemployment benefit to practically nothing.

"Year by year the volume of legislation dealing with purely industrial questions is steadily increasing, and unless the manufacturers actively bestir themselves by giving detailed information to their shareholders and employees and the general public of the disastrous effects of current legislation upon their particular trade and prospects, I am afraid many of our manufacturing concerns will be faced with total and permanent extinction before the British public has realised what appalling disaster this would bring upon themselves and their descendants."

Lord Colwyn, speaking at the luncheon, said: "In trade we are facing circumstances that we have never faced before, and the workpeople are bearing their share in a magnificent manner. I want to say with all the power I can, in this crisis that is frightening some men, let us stand firm as rock. We must not look to the Stock Exchange for money, but to the honest business of which we are part and parcel. I, as a banker, see the spirit of speculation destroying a great number of people. Speculation is the wrong way."

American Trade in Sulphuric Acid

AMERICAN exports of sulphuric acid in 1927, 1928 and 1929, averaged roughly 3,500 short tons. Over 60 per cent. of the 1929 exports of this commodity went to North and Central American and West Indies countries and 36 per cent. to South America. Imports chiefly from Canada have exceeded exports in every year since 1923 as indicated by the following data in short tons: 1923—11,754; 1924—7,734; 1925—18,192; 1926—27,969; 1927—17,434; 1928—13,164; 1929—8,104.

Packing Chemicals for Overseas

Factors which Influence the Choice of Containers

Some of the many problems involved in the packing of chemicals for long distance transport are dealt with in the following article, which is taken from recent issues of the "I.C.I. Magazine" and based on the practice of the I.C.I. Packages Committee.

THE problem of packing goods for overseas can be solved only by giving consideration to a great many points. It is not just a matter of providing a sufficiently strong package which will withstand rough usage and in certain cases keep out moisture, but the material and construction of the package must be such that it not only has no effect on the contents but also that the contents have no effect on it. In addition, there is always the interesting problem of what the customer wants, and there are many parts of the world where a package has to be more expensive than necessity alone would require. In meeting customers' wishes care has to be exercised, for if the package is more valuable or heavier than occasion warrants, customs duty will probably be charged on the packing.

The simplest package is the bag. Bags are generally made of jute, and there is an industry in Scotland, centred in Dundee, in the manufacture of such bags. Large quantities are also imported from Calcutta, and these are generally of the heavier type. In addition to the single bag, bags may be lined with waterproof, or waxed paper, or double bags may be used. The great advantage of bags is that they are light and hence the carriage on the tare weight is only a small amount. They are also easily slung, and a much greater weight can be picked up in a crane than probably any other form of package of the same individual capacity.

The bags after filling are closed by stitching. The ordinary hand stitching is the most usual; it has, however, the disadvantage that the bag can be partially opened and the contents pilfered, there being no great difficulty in closing the bag again. For this reason, machine stitching has displaced hand work in some factories. There are two forms of chain stitch used, one made with a single thread and the other made with two threads interlocked on one side of the material. Both can be opened more readily than hand stitching, provided the right thread at the right end is drawn, but when once opened the bag cannot be reclosed by hand without detection.

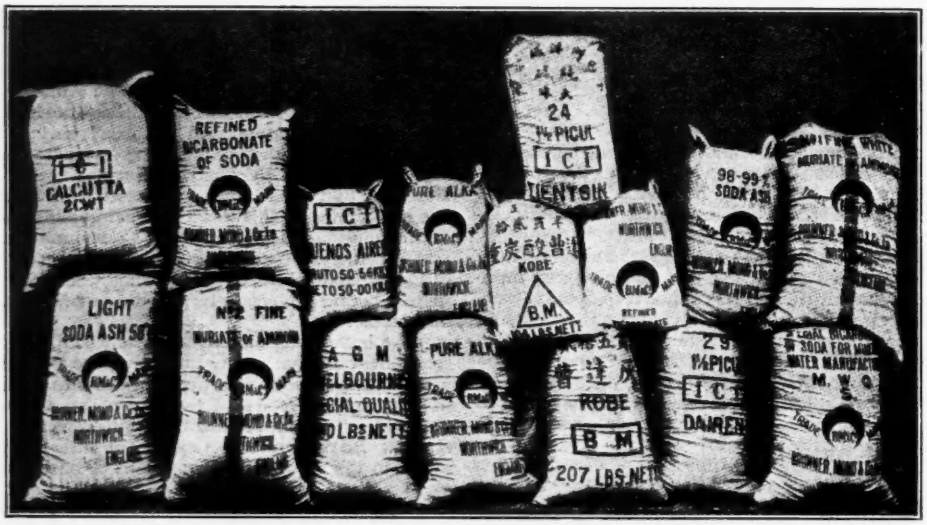
It will be apparent that only certain chemicals, such as bicarbonate of soda, soda ash or fertilisers, can be exported in bags, and even for these products bags are not the only package used.

The Use of Drums

Steel drums are used for packing products in the fused solid form and also in the form of broken pieces, flakes, crystals, powder and pastes. Products packed hot in the fused solid form, such as caustic soda, sodium cyanide, sodium sulphide and calcium chloride, form when cold a mass solid in the drum, which fits it perfectly; the metal of the drum need therefore be only mechanically strong enough to withstand the packing, but in some cases this is a very arduous condition; sodium cyanide, for instance, brings the drum to a red heat and caustic soda is also extremely hot. Products in the form of broken pieces, cakes, crystals and powder require a drum which will not only carry the weight but which will not collapse when stacked or roughly handled. For this purpose the sides are sometimes corrugated, and when this is not permissible, heavy gauge sheet is employed in the manufacture.

Changes of climate and temperature during transit and storage are frequently detrimental to the tightness of a package, and if the package is not moisture-proof under all conditions the contents will usually suffer.

The weakest point in any package is the lid, and this is particularly the case in a drum. The ideal drum has no lid and this type is used for bleaching powder, which is very sensitive to atmospheric conditions. The top of the drum is omitted in the manufacture and is seamed on in a special machine after the drum is filled. Some products cannot be packed in this way. All fused products are packed through a lid $4\frac{1}{2}$ in. to 5 in. diameter, and the lid is then expanded into the drum. Drums for powders, broken pieces and crystals usually have a lid of this diameter, but sometimes it is 7 in. or 11 in. in diameter to facilitate packing and emptying. The lid is sometimes used to describe the contents by means of an additional enamelled press in lid.



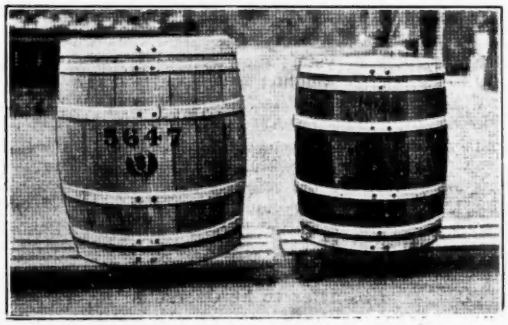
A CONSIGNMENT OF I.C.I. CHEMICALS FOR AUSTRALIA, SOUTH AMERICA, INDIA, CHINA AND JAPAN.

Transport Methods Overseas

The size of package is not always determined by the quantity the purchaser requires, but in many cases the determining factor is the mode of transport. At home we are accustomed to heavy six-wheeled lorries, ten or twenty-ton railway trucks and great ocean liners, but I.C.I. goods go to many parts of the world where the pack mule is the only means of transport, and to other parts where man alone can penetrate. Thus many tons may be despatched in one consignment in packages of less than 50 lb. each, for the only reason that a man has to carry the goods many miles from the coast. For the same reason the shape of a package has to be considered in some cases and dimensions may be strictly specified by the customer.

The drum has, until recently, been of the nature of a sealed package which is not intended to be opened until the destination

is reached and the contents used. There are, however, products which are used in only small quantities but which it is desirable to pack in relatively large units. In such cases a drum with a lid which can be opened and closed at will is required. For small lids a screw cap or plug is used, but where a large lid approximately the full diameter of the drum is required the problem is a difficult one. It has, however, been solved by I.C.I., and a drum is now available for I.C.I. customers which provides every convenience in filling, emptying



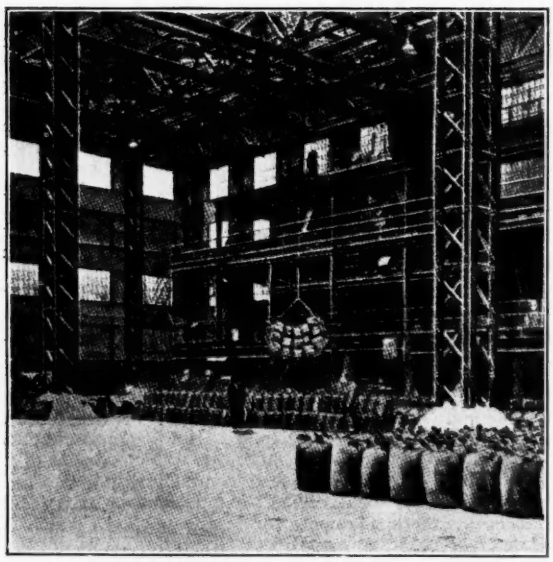
THE DOUBLE CASK FOR TRANSPORT OF FULMINATE OF MERCURY. THE OUTER AND INNER CASKS.

and sampling of contents and at the same time is always watertight.

Wood Casks and Kegs

In deciding the type of package in which a product is to be carried, custom plays an important part, and there are packages which are used simply because it is the custom to do so. The package may be the result of experience or may be the best which could be obtained at the time the traffic was instituted, and a customer continues to specify a certain package frequently in ignorance of improvements which have been effected. Customers are naturally so anxious that the goods should arrive in good condition that they are sometimes unwilling to change from a package which has proved suitable, although suppliers may advise them that new and improved types of package have been introduced.

Steel drums and bags are slowly taking the place of wood packages, but there is still a big demand for casks and kegs, and of course there are many cases in which wood is the only material which is suitable. There is at present a limit to the size of drums for certain classes of goods, while casks can be made to carry much greater bulk and weight. The reason



INTERIOR OF I.C.I. WAREHOUSE AT WALLERSCOTE, SHOWING RUN-WAY CRANE IN ACTION.

for this is that a drum is cylindrical, whereas a cask has a bilge, and just as the invention of the arch in architecture made bridges possible and enabled building construction generally to make great strides, so the utilisation of this invention in the bilge cask greatly increased the size of package which could be made, or for smaller packages, reduced the strength of timber required. The bilge has an additional advantage for large packages, in that it enables the cask to be easily rolled in any direction.

This particular advantage of the bilge depends, of course, on the employment of men for handling goods. No doubt the time will come when men will cease to be beasts of burden and the use of mechanical and electrical lifting and travelling appliances will be universal. When that time comes the bilge will have lost one of its advantages, and just as the arch is no longer a necessary principle in bridge and building construction, so large packages will probably be designed without a bilge. The bilge cask has one very great drawback: it involves considerable wastage of space when a number are stacked, say, in the hold of a ship. This applies also to a lesser extent to every circular package, although such packages are the lightest and strongest.

As is well known, a cask is built up of staves shaped so as to form a bilge and held in position by hoops. The staves may just butt against one another, and be held tight by pressure of the hoops, or the edges may be tongued and grooved. The timber used may be soft wood or hard wood. Soft wood is usually imported fir from Archangel or Sweden, and hard wood includes oak and certain other Australian timbers. The distinction hard wood and soft wood is not exact, but is quite useful in the trade.

Some casks are made in I.C.I. cooperages, but many are purchased after arriving in this country from abroad containing imported materials. Butter comes from Denmark in small bilge casks; tallow and other similar commodities come from Australia, New Zealand and the Argentine in so-called hard wood casks. Casks, after being used for imported wines, also beer and whisky casks, are used, all being of excellent timber and sound construction.

A very special type of cask is used for the export of fulminate of mercury. This material is used in detonators and is of an extremely explosive nature. It is packed in the form of a paste in cotton bags, and a number of the bags are placed inside a cask. This cask is fitted inside another cask with suitable means of holding it rigid with a space between the two. Both casks are watertight and are filled with water so that the material is not only maintained wet but is surrounded by a water jacket. By this means this highly dangerous product is safely transported abroad.

The term "keg" is sometimes used to describe the small bilge cask, but is also used to designate a cylindrical package. The kegs specially referred to are made of veneer. They form an exceedingly strong and light package and are made at two factories in I.C.I. The keg consists of thin wood sheets which are stripped off a log of wood in a special machine. The sheets overlap and are secured by wood bands sometimes reinforced with iron banding.

One advantage of both kegs and casks is that they have full opening tops, the head being readily removable for filling and emptying the contents. The veneer keg, being cylindrical, has, like the steel drum, a size limit, and for this reason is being displaced to some extent by the steel drum with a full opening top.

Borax in Glass: A Corrected Statement

MR. EDWARD MEIGH, speaking at the British Glass Convention at Buxton last week, called attention to certain reports which had appeared in the press concerning his remarks on borax. He was reported to have invited glass manufacturers to take the plunge and dispense with the use of borax. This was the very antithesis of what he wished to convey, and what he did in fact convey. When he used the words "take the plunge" he was referring to the use of borax rather than its discontinuance. He explained carefully in his speech that, after nine months' trial, they decided to dispense with the use of borax, and that he personally was not happy about it. He wished to make this statement very definitely and publicly in order that an injustice might not be done to those interested in the supply of borax.

Conditions of Trade in Canada

Points in Salesmanship

A BRIEF official tour of certain parts of the Province of Quebec has recently been made by H.M. Senior Trade Commissioner in Canada, who visited, among other places, Quebec City, Three Rivers, Sherbrooke and St. John's. The following observations, taken from his report, indicate some of the essential conditions of securing trade :—

Quebec Province shares with Ontario the distinction of being reponsible for more than half of the industrial output of the Dominion. Its industries are numerous and varied, and it is strongly represented by the pulp and paper, silk and artificial silk, cotton and other main industries. The value of the manufacturing output of the province is greater than that derived from any other industry, manufacturers contributing about 44 per cent. of the value of all production ; farming is credited with about 24 per cent., and construction has occupied third place in recent years.

A Bi-Lingual Market

In dealing with the Province, United Kingdom manufacturers must bear in mind a number of important differences when comparing the market with other sections of Canada. One of these factors is the French element. In the city of Montreal, the population of which is about a million, a great deal of business is carried on in English, and in certain sections it is not very apparent that one is in a French-Canadian community. The city is responsible for a considerable amount of distribution of commodities throughout the Province of Quebec. Many manufacturers in the smaller cities and towns buy their supplies through Montreal houses ; these include such products as machinery, glues, dyes, chemicals, firebricks and so on. United Kingdom exporters who can establish connection with a reputable house in Montreal may secure, in many trades, therefore, satisfactory distribution throughout Quebec. This applies to branded and proprietary goods and to certain bulk commodities. At the same time, a number of manufacturers in the smaller cities of the Province are making their larger purchases direct from Canadian, United Kingdom or foreign firms, and firms of any size usually do so. In these cases, the value of personal canvassing by representatives of United Kingdom firms cannot be over-emphasised. It is often said that the contact of United Kingdom firms is not as frequent or as forceful as that of American competitors, who spend almost as much time in Canada as in their own market.

In the cities and towns outside Montreal one realises fully the existence of a French-Canadian community. The French-speaking population varies in different towns from, say, 60 to 90 per cent. In Three Rivers, for example, of a population of about 30,000, approximately 28,000 are French. In St. John's about 12 per cent. only are English. A surprisingly large number of the French people speak English, but at the same time there are about 900,000 persons over ten years of age who speak only French. While, therefore, it is quite possible for United Kingdom firms to do business throughout Quebec Province in the English language, even a small knowledge of French is very useful, and is appreciated by the people of the Province.

Labels in Two Languages

The labels of package goods, such as products which sell in the druggists' trades, are almost invariably printed in the two languages when for sale in Quebec Province. Instructions for the operation or repair of machinery are also printed similarly. United Kingdom manufacturers who will take the pains to regard Quebec Province as a bi-lingual market, and who govern themselves accordingly, will have taken a useful step towards the extension of their Canadian trade.

The frequency with which the representatives of competitors call upon likely buyers is very impressive. They do not always receive an order, but when orders are being placed they are always on the spot. This is the case also with a few United Kingdom firms who know the market, but for each United Kingdom manufacturer who has the close relationship with buyers that is necessary many more United States firms are enjoying it. British firms generally lack the intimacy of contact with Canadian buyers that has been cultivated for many years past by our principal rivals in this area. Briefly, the mistakes of United Kingdom firms have been based on a lack of knowledge of the general requirements and the speed of business in Canada. Many United Kingdom firms are doing very well, but not enough of them are in evidence to change the Canadian import figures to any important degree.

The development of water power and the establishment of a number of new factories in Quebec Province have quickened the sales of electrical, production and other machinery, construction equipment, glass building materials, and so on, and this condition is likely to continue for a while.

On every hand there are evidences of the extension of industry. Products not previously made in Canada are being manufactured, and new mills are being established for the production of lines now being made.

A number of silk and artificial silk mills have been established in Quebec Province during the past few years, and there appears to be over-production, both in the real silk and the artificial silk hosiery industries. A number of reductions in the price of silk hosiery have been made. Certain firms have apparently put cheaper lines on the market, retaining prices as they were on their main and more expensive brands.

Many manufacturers are selling direct to the retail trade, and not through wholesale houses. An important producer of cotton goods, for example, adopted this policy not long ago, and one of the largest makers of hosiery recently changed their policy in a similar way.

Obstacles to be Overcome

Many obstacles must be overcome by United Kingdom firms desiring to do business here. There is a certain amount of interlocking of directorates of firms, and this influences a great deal of business, and is not easy to overcome, except by the force of superior quality and attractive prices.

Canadian firms buying their supplies from the United States or in Canada are able, as a rule, to take short deliveries from time to time as needed, instead of taking, in many instances, cargo lots from the United Kingdom and storing in their yards or warehouses. This is a factor, for example, in the coke trade.

Packing charges as a rule are less for United States than for United Kingdom goods.

The outlook for business in Quebec Province during the balance of the year is fairly good. There is a lull in retail trade at present, which is shared by the wholesale and manufacturing houses, several of whom are carrying heavy stocks. The attitude of United Kingdom firms should be one of caution, combined with a careful and persistent canvass for the business that is offering.

An Empire Wool Research Conference

DR. S. G. BARKER, director of the Wool Industries Research Association, presented a paper at the first Wool Research Conference of the Empire, which Mr. J. H. Thomas, M.P., opened in London on Monday.

In a plea for the fuller exchange of research staffs between the Dominions and this country, he pointed out that electrical and chemical engineering professors were furnished with a wealth of adequate text books and fundamental knowledge of their subject, but in wool such knowledge was largely unavailable, or unknown. If, however, the old-established wool industries were adequately to compete in the textile markets with chemically produced fibres and filaments, not only must we maintain the highest mechanical efficiency in our processes, but of necessity there must be an adequate development of the electrical and chemical engineering sides to keep pace with the evolution of modern thought and progress. A primary need of the wool industries of to-day was therefore that, in accordance with the evolution and trend of modern industry, a thorough understanding of the chemical, physical, biological, and other factors concerning wool itself should be regarded as a fundamental necessity.

The scientist could not bring about a millennium in industry except by years of patient work, and this must be planned with foresight and with the ability to look ahead without financial anxiety. The more one " researched " into the process of the wool industry, moreover, the more one was convinced of the scientific basis of its established commercial practice. Dr. Barker went on to speak of the " competition of scientifically produced synthetic filaments for textile purposes which can no longer be regarded as artificial or imitations of anything else," and said," The scientists must endeavour to accelerate the revival of the wool industries by furnishing them with adequate scientific knowledge to fight the competition of other scientifically produced textile fibres."

European Sulphuric Acid Trade

Factors that Regulate Production Figures

An interesting survey of European production of sulphuric acid and the conditions governing trade in this commodity are contained in the following article by H. O. Moraw, of the Chemical Division, U.S. Department of Commerce, published in "Commerce Reports."

GERMANY, France, Great Britain, and Italy are the four principal factors in European sulphuric-acid production and consumption, and contribute over 65 per cent. of the entire European output. Belgium occupies fifth place as a sulphuric-acid producing country, but about 23 per cent. of its output is shipped to near-by foreign markets.

Official statistics of sulphuric-acid production are issued by many countries, and the relative position of the trade in others can be judged sufficiently well by trade circles to supply good approximations. Such a set of figures was compiled for the use of the League of Nations Economic Conference in 1925, which estimated world sulphuric-acid production, on a 50° B. basis, at that time as 16,900,000 metric tons, as compared to 12,713,000 tons in 1913–14.

Estimates compiled in the Chemical Division, using as many 1929 figures as available and supplementing 1928 figures for some minor producing countries, show the total world output of sulphuric acid, expressed as 50° B., in excess of 21,400,000 metric tons. European production is over 10,450,000 tons, or about 48 per cent.; North American, 44 per cent. (United States, 37 per cent., and Canada, 7 per cent.); and Asia, Africa, etc., 8 per cent. Estimates of the sulphuric-acid production of most of the European countries are shown in the following table:—

Country.	Thousand metric tons.
Germany	2,336
France	1,650
Great Britain	1,550
Italy	1,304
Belgium	936
Spain	750
Czechoslovakia	400
Poland	388
Netherlands	200
Russia	188
Sweden	177
Portugal	173
Denmark	120
Switzerland	76
Greece	70
Austria	62
Roumania	36
Latvia	25
Finland	16
Total	10,457

Little Production from Natural Sulphur

There is a marked contrast in the proportions of acid produced from the principal raw materials in the two major acid-producing centres, North America and Europe. In the United States at present 60 to 65 per cent. of the acid is produced from sulphur and about 18 to 20 per cent. from pyrites, as compared with 2·5 and 71 per cent., respectively, in 1914. In contrast there is comparatively little acid production in Europe from natural sulphur. Although about 60 per cent. of all world sulphur imports entered the European area, Germany and Great Britain are the only countries where any appreciable quantities of sulphuric acid are produced from sulphur. Sulphuric acid is practically all produced from sulphides in Spain, Belgium, Italy, France, Poland, Sweden, Portugal, Russia, the Netherlands, Greece, and Czechoslovakia. Approximately 24 per cent. of Great Britain's acid is from spent oxides, and 17·5 per cent. from brimstone.

The use of zinc blend for sulphuric-acid production in Europe is centred chiefly in Poland, Belgium, and Germany, where 86, 50, and 14 per cent. respectively, are produced from this raw material. In Great Britain about 0·2 per cent. is produced from zinc blend.

Plans to Increase Output

As mentioned, most of the leading European sulphuric-acid producers are planning increased production over the next few years. As the consumption of this product is so largely dependent on favourable agricultural conditions, it is recognised that there is some danger of over-production, and that it is necessary to gauge production, according to conditions in the world fertiliser trade, with due allowances for expansions in the other chief consuming industries. It is also necessary to keep a close surveillance of the more important developments tending to eliminate the need of sulphuric acid, particularly, synthetic nitric-acid production by ammonia oxidation and production of phosphoric acid by pyrolytic methods without the use of sulphuric acid. Not only in the United States, but also in Italy and elsewhere the ammonia-oxidation method has displaced much of the sulphuric-acid-sodium-nitrate process for the production of nitric acid. Difficulties which at first caused production costs to be higher than by the old process have been overcome; as a result, further installations are being made with the resulting effect on sulphuric-acid requirements.

Production of fertiliser materials probably consumes over three-fourths of the European production of sulphuric acid. As in the United States, the other large consuming uses for this acid include petroleum refining, iron, steel, and metallurgical operations, as well as the production of chemicals, and rayon and other textiles. Much of the recently increased consumption is attributable particularly to greater requirements for petroleum refining and rayon.

The urge in most European countries for securing greater crop yields per acre leads to advances in output acid schedules to meet expected increased fertiliser consumption. In Poland, for example, where in the last two years sulphuric-acid shortages led to the opening of some acid plants not used since the war, Polish trade circles consider that the output of acid should be expanded during the next few years from 55 to 60 per cent. (from 228,000 to 366,000 tons). Russia's expansion programme calls for about 100 per cent. increase; Belgium's, over 50 per cent.; the Netherlands, over 100 per cent.; and the plans of many other countries from 6 to 75 per cent.

Large Amount of Trade

Sulphuric acid is a commodity that does not lend itself to long-distance transportation; hence, sulphuric-acid plants usually are located with regard to supplies of sulphur raw materials and distribution of the acid or products thereof. This is particularly true of European countries. The short distances between some of these countries permits a greater foreign trade in this chemical than so far has developed in any other area.

The sulphuric-acid imports which can be accounted for in the European area total nearly 349,000 metric tons and the exports almost 377,000 tons. Belgium holds the unique position of being the largest world exporter of this commodity, averaging about 230,000 metric tons in 1928 and 1929. Germany, the Netherlands, Poland, and France, in the order named, are the other leading exporting countries. The outgoing and incoming trade of France in 1929 practically balanced, each being about 20,000 tons. Germany imported 118,300 tons and exported 54,200. The Netherlands imported 183,000 tons and exported 38,000. Poland imported 900 tons and exported 29,000. Great Britain imported 1,600 tons and exported 5,400. Latvia and Austria each imported 2,200 tons; Sweden, 2,400; and Switzerland, 5,000.

Utilisation of Peat in Manitoba

A UNITED STATES firm established in Minneapolis, Minn., is considering the erection of a factory in Manitoba which will utilise sphagnum moss in the manufacture of insulating materials for building construction. Huge quantities of this material are available in the muskegs or bogs contiguous to the Hudson Bay Railway, and the transformation of this into an article of commercial value will be one more factor in the promotion of successful operation of the new line.

Chemical and Allied Industries of Yorkshire

By Rex Furness

In the following article a general survey is given of the chemical industries of Yorkshire which, important in themselves, are perhaps even more important as producers of essential raw materials for many other of the industries carried on in the county. While the county has a considerable past in this field, it will be seen that there are many directions in which new developments are possible, and that these are being explored. Of recent chemical enterprises in the county the most notable is that of the Distillers' Co. at Hull for the production of acetone, acetic acid, etc., which is described and illustrated in detail in a separate article (pp. 272-6).

WHEN one begins to write of the developments, the present and future of chemical science or industry, it is perhaps quite natural that one calls to mind the achievements of notable men. The progress of chemistry cannot be reviewed without reference to such men as Boyle, Priestley, Dalton, and Faraday, nor can one think of the progress of the chemical industries without mentally living with Leblanc, Muspratt, and Perkin.

The importance of the chemical industries of Yorkshire to general industry within the county as well as throughout the land is not small, and one of its outstanding figures is Lord Brotherton, whose chemical works in Yorkshire have been in active operation for over fifty years. It was he who said, in his recent Messel Lecture, that the importance of the chemical industries is to-day much more appreciated by the nation. He emphasised the value of the industry not only in times of war, but also during the years of peace.

The Scope of Yorkshire Chemicals

We may justly take this text from a great leader in the Yorkshire chemical industries and see, briefly, how it applies to the industries of the county, showing how, indeed, it does serve mankind in a multitude of ways and does not live for itself alone. The sentiments put—quite wrongly, we hope—in the mouth of the traditional Yorkshireman by the old song, that "if ever you do anything for nothing you must do it, do it, for yourself," do certainly not apply to the chemical industries of Yorkshire.

It is well recognised nowadays that the chemical industries supply a host of materials which are essential to modern life and industry, and as we reviewed the chemical industries of Yorkshire in some detail in last year's Yorkshire number, it is proposed here to give a brief sketch only of their scope. The county possesses virile organisations which produce, amongst others, the following classes of chemicals.

1. Acids, alkalis and salts—the so-called heavy chemicals—for use in glass making, textile treatment, fertiliser production, leather manufacture, water treatment, metal working and so forth, industries carried on within and without Yorkshire.

2. Coal tar chemicals, motor spirit, creosote, dyestuff intermediates, ammonia, road dressing and surfacing materials, and so forth.

3. Fine chemicals, pharmaceuticals, dyestuffs and general organic chemicals for laboratory or works use.

4. Coke oven gas—a source of much future development.

5. Glass of many kinds, including plate and bottle glass, optical and "chemical" glassware, ornamental and resistant glasses, etc.

6. Ceramic wares such as fire brick of high and varied quality, chemical ceramic ware, as well as cement.

7. Oils, fats and soaps, wool greases and derived products. The vegetable oil extraction and expression industries of the county are a valuable asset of which space forbids further discussion.

8. Metals, including the better known steels and irons and the newer acid and heat-resisting alloy steels of which more must be said later.

9. Fermentation products, alcohol from molasses, etc.

10. Chemical plant and means for transporting and conveying chemicals.

If, then, we may pass so rapidly over the wide range of chemicals and allied products which are manufactured in Yorkshire factories and which are of great value as home sources of essential materials for the county's textile, coal, iron and steel industries, we may turn to a consideration of future developments which must inevitably come if the chemical industry is to progress as it has in the past.

Coal Tar and Gas

There is no question that research and endeavour will still continue in the heavy and fine chemical sections, and that ranges of dyestuffs will continue to expand. What, however, of the coal tar industry? New uses will be found for known derivatives such as creosote and much attention is being paid to the science of wood preservation with the aid of this coal tar distillate. Exports are diminishing and new markets must be found. The applicability of tar fractions to the surfacing of roads must receive continued study. The fixation of coal tar ammonia by cheap methods is necessary in face of the growing competition of the relatively cheap synthetic ammonia products. The yields of motor spirit, benzol and the like, must be increased and new methods found for converting uneconomic fractions of coal tar into light spirits suitable for internal combustion engines. Thus, the destructive hydrogenation process may be applied with effect to coal tar as a whole or to relatively useless fractions, so that home supplies of motor fuel may more nearly meet home demands.

Similarly, the enormous supplies of coke oven gas should find even better uses. Already, of course, much gas is being used by domestic consumers and a greater linking up of coke ovens with towns gas distributing systems—a project first conceived and put into practical operation in Yorkshire—will mature. Still further, however, it must be realised that coke oven gas is a potential source of many raw materials for the making of "aliphatic" chemicals, just as coal tar has been made the source of raw materials for the manufacture of "aromatic" chemicals. From coke oven gas there can be extracted very cheap hydrogen for use in synthetic ammonia or synthetic alcohol manufacture and in destructive hydrogenation operations of the Bergius type.

From the residual methane, acetylene and ethylene as well as benzene can be made, and with these as starting materials, the application of already known processes for the making of synthetic acetic acid, alcohol, ethylene glycol, ethylene dichloride, synthetic rubber, etc., may be found possible, provided the raw materials are sufficiently cheap.

It is clearly impossible to discuss in this general article the possibilities and economics of a multi-by-product recovery scheme as applied to "cracked" methane from coke oven gas, but it is an abundant cheap material in Yorkshire and "cracking" processes are already known. Once the cheap production of, say, acetylene and ethylene is assured, it will be possible to apply the further stages in the processes towards synthetic aliphatic chemicals which are not only known but are already in technical operation—the original gases ethylene and acetylene coming in these instances from other sources, such as natural gas in America, calcium carbide, etc., at a cost which should be

no lower than if the gases were obtained from coke oven gas in a well organised multi-by-product recovery system. The problem is of extreme difficulty, but its solution technically will bring a great reward just as the recovery or production of benzene, toluene, anthracene, etc., from coal tar in a multi-by-product recovery scheme brought a reward to the tar distiller.

The distillation of coal tar in order to recover a small percentage of benzene, phenol or anthracene could never have been economical any more than the production of a small percentage of acetylene or ethylene or benzene by cracking coke oven gas (methane) can hope to be, but by working up all products and finding suitable applications—a reasonably easy enough proposition in the light of modern processes already in operation—the process should find economic justification.

Coke oven gas used to be wasted absolutely; to-day it is being more usefully applied as a domestic fuel; to-morrow it may prove to be as rich a source of raw materials as coal tar is.

Chemical Plant—Metallurgy

The availability of first class chemical plant is essential to effective progress in the industry, and Yorkshire is fortunate in possessing makers of repute. It is unnecessary to describe in detail the types of plant which are made in the county, but it may be said that general and specialised apparatus for the carrying out of heavy or fine chemical making operations, for the various phases of the important problems of mechanical handling and conveying of chemicals, and for the transport of chemicals in bulk is made in Yorkshire factories. The plant maker has taken advantage of the metallurgical resources of the county, and these, as is well known, are not small.

Reference only need be made to the reputation of Yorkshire iron and steel manufacturers, but more must be said of the progress which has been made in recent years in the manufacture and fabrication of special irons, steels and alloys.

Yorkshire firms have specialised in the production, for instance, of acid resisting steel alloys, and the value of the so-called rustless and stainless irons and steels is well known. Many modern chemical processes would be economically impracticable in the absence of such materials of construction.

In addition, there are made the heat-resisting steels, which retain their strength at high temperatures and which are not subject to attack by oxygen even at these high temperatures.

To attempt to illustrate the manifold applications of these special steels is beyond our present scope, and it is a matter which has been dealt with by the writer in special articles. What is of first importance, however, is that the manufacturers of these alloy steels have studied their mechanical and working properties, and it is now possible for chemical plant makers to fabricate intricate types of apparatus from these metals. It is not very long since many of the special steels were merely interesting laboratory products which, when tried out in plant making, failed by reason of some difficulty in fabrication. To have solved the many difficulties of working with these materials is a real triumph of Yorkshire metallurgists.

Processes at High Temperatures and Pressures

As industrial chemistry progresses, it is becoming more and more apparent that plant which will stand up to severe conditions of temperature and pressure, acid attack, and so forth is essential. Many reactions which are to-day being applied on a grand scale are only realised under conditions of temperature and pressure which could not have been withstood by any known metal a few years ago. The work of the Yorkshire metallurgists has made possible the progress of technical chemistry in several important directions, a few of which are well worth recording briefly.

The following list affords instances of chemical reactions which must be worked under severe physical conditions if technical and economic success is to be realised :—

1. The production of synthetic ammonia from nitrogen and hydrogen, reacting in the presence of a catalyst at temperatures of around 500° C. and pressures of from 100 to 1,000 atmospheres. The *rôle* which the plant maker plays here is sufficiently obvious.

2. The manufacture of synthetic methyl alcohol from carbon monoxide and hydrogen under conditions closely similar to those noted in (1).

3. The destructive hydrogenation of coal or high boiling oils for the production of low boiling spirits for motor fuel by processes akin to the original Bergius method. Here, again, temperatures and pressures in the order of those alluded to above are necessary.

4. The ordinary "cracking" process whereby high boiling mineral oils are transformed into low boiling spirits for motor fuel. Billions of gallons of motor spirit are made annually by the various cracking processes, which all demand plant that will withstand high temperatures and frequently high pressures without the chance of failure.

5. Synthetic acetic acid manufacture calls for pressure containers which are also highly resistant to acid attack. The failure of such plant in the past has brought disaster in many countries of the world.

6. The modern tendency in steam generation is towards higher and higher pressures even up to the critical pressure of water vapour. Boilers working at well over a thousand pounds to the square inch are common, and experiments have been made up to three thousand pounds. The developments in the burning of pulverised fuel have brought in their train many demands upon the plant maker and metallurgist.

7. The oxidation of synthetic ammonia to nitric acid can be speeded up as a whole by the use of pressure, and plant has had to be developed to stand up to these severe conditions. Many processes of hydrogenation are worked to-day under high pressures, and instances may be given in the manufacture of hydrogenated naphthalene products such as tetralin and decalin, of hydrogenated phenols such as hexalin and methyl hexalin, of synthetic menthol and so forth.

8. Processes of soap boiling under pressure and fat splitting without reagents under high pressure are being studied and call for special plant.

It would be possible to cite many other developments which are in the air, so to speak, at the moment and which necessitate the use of special chemical plant, even if their very progress is not being delayed by the absence of such plant, but it will be sufficiently apparent that the combined skill of the metallurgist and the plant maker has already aided in no inconsiderable degree the progress of modern applied chemistry. Yorkshire is fortunate in possessing both highly skilled metallurgists and progressive metallurgical industries and enterprising plant makers who are ever ready to avail themselves of the products of their metallurgist colleagues.

The Universities

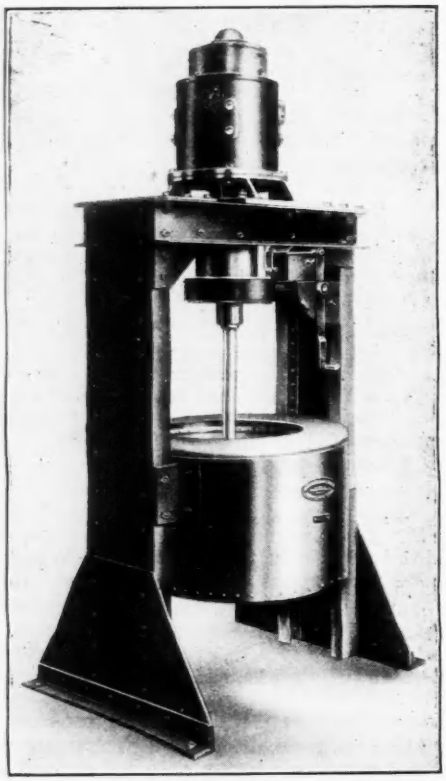
Some account of the fundamental work of the Universities of Yorkshire was given in our article on the industries of the county a year ago, and we may here crystallise our views by giving a very apt quotation from Lord Brotherton's address previously alluded to in our introduction. Of the universities of this country—and perhaps even more he may have been thinking of those in his own county—Lord Brotherton said that "they have a great destiny, and under wise guidance they will realise their responsibilities to the industrial world while in no way disregarding the provision of all that refreshes and enlarges the human mind, enriches life, and ministers to a cultivated leisure."

Yorkshire Chemical Firms and Their Products

We give below some particulars of a number of Yorkshire chemical firms and the products that they manufacture or handle, together with notes on the technical colleges at Huddersfield, Bradford, and Leeds.

Thomas Broadbent and Sons, Ltd.

Year by year the use of centrifugals in the heavy and fine chemical industries is increasing, and they are finding successful application in spheres to which they have never previously been applied. The centrifugal system gives a constant result and unvarying quality in the product, and its advantages are being made even more manifest with the wider adoption of the



THOMAS BROADBENT AND SONS' "WESTON" TYPE CENTRIFUGAL.

direct electrically driven centrifugal, which is now rapidly superseding both the steam and belt driven machine. This type accelerates very rapidly, is more economical in power, and the maintenance cost is considerably reduced. Our illustration shows a direct electrically driven "Weston" type centrifugal, a very successful model manufactured by Thomas Broadbent and Sons, Ltd., of Huddersfield, one of the best-known makers of centrifugals, whose products embody the result of 64 years' experience.

Not only are their machines made in wide variety, but they have an enviable reputation for durability, maintained in several instances after a quarter of a century's continuous service. Specialised models are built for processes of separation, decantation, clarification, precipitation, degreasing, nitration, etc., and are provided with various forms of drive. The suspended types include: Direct steam engine-driven, with or without bottom discharge; direct electrically driven, with or without bottom discharge; belt driven with overhead countershaft; belt-driven, with countershaft on breastplate; self-contained motor driven, etc. Among the over-driven types are the belt-driven, water-driven, motor-driven, oil-engine driven, and direct electrically-driven all with central bottom discharge. Other types, such as sawn-neck, are also supplied. As well as the ordinary centrifugals, types fitted with such additions as discharge hoppers, mixing tanks, conveyors, air heaters, fans, skimming attachments, etc., may be obtained, and laboratory scale units are also available.

Brotherton and Co., Ltd.

The work which Lord Brotherton has done for chemical industry received public recognition this year when at the annual meeting of the Society of Chemical Industry in July he was presented with the Messel Medal, and Dr. Levinstein recalled how from small beginnings, by enterprise, by great industry and the force of personality, he had built up one of the most successful chemical industries in the country. Lord Brotherton then delivered the Messel lecture and in doing so told the story of the growth of his firm, Brotherton and Co., Ltd., of Leeds, which from small beginnings at Wakefield in 1878, has now important branches in Liverpool, Manchester and Glasgow and agencies throughout the world. Starting with the manufacture of sulphate of ammonia, research was undertaken and plant added for the production of a pure ammonia to meet the needs of the textile trade. In 1888 tar distillation was undertaken at Stourton, Leeds, and five years later another works was secured at Birmingham for the distillation of ammonia and the manufacture of sulphuric acid. Further acquisitions followed in Liverpool for tar distillation, in Glasgow and Sunderland, and in 1913 at Workington.

Notable work was done by the firm during the war in the manufacture of various explosives; the output of liquor ammonia was increased to the utmost limits, and new plants established, among other places, at Newcastle, Nottingham, Sheffield, and the various shale oil distilleries in Scotland. An important war-time development was the purchase in 1917 of the Mersey Chemical Works, Bromborough, Cheshire, established by a combination of big German colour-producing firms for the working of some of their patent processes in this country. This enabled Lord Brotherton to realise his ambition to complete the range of manufactures of his company from coal tar to dyestuffs in his own factories. A select list of colours is being made there, but the product to which principal attention is paid is sodium hydrosulphite, required in increasing quantities in connection with the bright and fast vat colours. Plant has also been installed for the manufacture of liquid sulphur dioxide and of a range of sulphites and bisulphites.

Emco Dyestuffs, Ltd.

Emco Dyestuffs, Ltd., of Sculcoates, Hull, was formerly a branch of Major and Co., Ltd., a company established some 65 years ago. Actual work in the manufacture of dyestuffs commenced in 1918, when operations in the manufacture of T.N.T. ceased. In the initial stages progress was of necessity slow, but rapid progress has been made during the past few years from the time when they decided to specialise in the production of dyestuffs with definite fastness properties. The firm have been pioneers of many products for the textile, printing ink and paint trades, concentrating mainly on azo dyestuffs for use in paint and enamel, cellulose lacquers, printing ink, leather dyeing, linoleum, etc.

They were, it may be recalled, the first firm in this country to produce and therefore render unnecessary the German importation of Permanent Red R, Permanent Red B, Permanent Red 2B, Permanent Red 2G (in dry form), Helio, Bordeaux B.L., Rubber Orange Y.O., stabilised diazo compounds, and fast printing pastes. The difficulties attendant on the production of such a formidable range of products need not be emphasised.

The works have, during the past four years, extended in ground area from four to almost seven acres. The technical staff is adequate for the requirements of the company, and the qualifications of its members are high. Well-equipped laboratories, staffed with competent chemists, take care of the research end. The turnover during the past five years has been more than trebled, while the export business is expanding. In addition to numerous azo dyestuffs, nigrosines, etc., the range of products also includes various intermediates. Emco Dyestuffs, Ltd., restrict their business to the colour maker and do not cater for consumer needs.

General Refractories, Ltd.

The amalgamation of a number of companies engaged in the making of firebricks and other refractory materials, produced General Refractories, Ltd., with headquarters at Sheffield, a firm capable of supplying refractory materials of every description—bricks, blocks, tiles, shapes, sands, pastes, powders and lumps—and also a large variety of mineral products of other kinds. Its specialities are materials for withstanding the high temperatures used in the manufacture or treatment of steel, iron, copper, brass, glass, zinc, bricks, pottery, lime, gas, coke, and chemicals, as well as fluxes, such as limestone, and fluorspar, lime of all kinds, limestone and dolomite for glass, sugar and steel making, and for use in the chemical industry, and heat insulation materials. The firm is the sole producer of " Yorkshire Sand " for steel foundries, " Bramcote Sand " for iron foundries, " Maximum " and " Minimum " core sands, " Pyrolyte " cold setting fire cement, and " Plasstick " refractory lining and patching paste. Twelve varieties of bricks are manufactured, each serving a different purpose and sold under branded names. In addition to Sheffield, General Refractories, Ltd. have extensive works at Worksop, King's Lynn, Ambergate, Bramcote, Wolsingham and Buxton, some of which have recently been fitted with the most modern equipment and others are being similarly treated.

Glover Bros., Leeds

The old-established firm of Glover Bros. (Leeds), Ltd., of Wortley Low Mills, Leeds, for the past ten years have been running a chemical section with well equipped laboratories as a subsidiary to the old company. The original object of the department was to carry out experiments and tests in conjunction with the woollen manufacturing section, whereby the textile trade generally might benefit. Early results proved so satisfactory that several products were immediately placed on the market, and from time to time these have been improved and others added to the range. The plant has been enlarged and more trained chemists engaged. Of the various products manufactured by the concern, the following are constanntly commanding increased sales.

Texogent in various brands is primarily a degreasing agent and solvent. It is used largely in the scouring of raw wool, woollen piece goods, yarns, hosiery, artificial silk, etc., and also in many trades where the removal of grease and dirty matter is essential.

Resistone " K " is a resist for animal fibres and acetate silk against cotton dyestuffs. This product was introduced in order to reduce to a minimum the affinity of cotton dyestuffs for animal fibres. Results have shown this product to be of immense value to the trade.

Resistone " O " is a mordant for basic colours on cotton and all cellulose fibres, effecting a very considerable saving in time and labour over the older process of mordanting with tannin and tartar emetic.

In addition to the above, the firm do an extensive business among leather manufacturers. The GB range of waterproof leather finishes are entirely different in character from the type of finish usually offered to the trade. Made by a special process, it embodies properties which make it eminently satisfactory from the point of view of fastness to wet and dry rubbing, durability, etc. A special type of chrome liquor, which offers many advantages to the chrome tanners, is also marketed.

Finally, it may be mentioned that the firm's chemical staff are always eager to help with any problem or difficulties that may be encountered in the various industries concerned.

E. G. Jepson and Co.

E. G. Jepson and Co., 5, Crown Point Road, Leeds, are one of the oldest firms in Yorkshire dealing in chemicals, etc., having been established in 1806. Their business interests include important agencies for bichromates, borax and boracic acid, alum, roll and rock sulphur, and acetic acid. In their warehouse in Leeds they hold stocks of acids, chemicals, and dyewares used in the majority of Yorkshire industries, especially those used by dyers and tanners. In addition they have a department dealing solely with fertilisers and horticultural products.

Edgar Allen and Co., Ltd.

One of the most important machines manufactured by Edgar Allen and Co., Ltd., Sheffield, is the K.B. Pulveriser. This is an all-steel hammer mill, constructed throughout (even the flywheel) of Edgar Allen high-grade steel, the result being a machine of the sturdiest construction, suited for hard wear and capable of withstanding severe shocks.

Pulverisers that use a blow instead of slow pressure for pulverisation, are becoming more and more popular. They are suitable for reducing many kinds of materials, and it is becoming recognised that for pulverising chemicals to fine powders they have many advantages over other types of machines. Among the materials successfully reduced by K.B. Pulverisers are asbestos, asphalt rock, coal, charcoal, copper ore, felspar, fluospar, glass, granite, gypsum, mica, magnesite, phosphate rock, salts, soapstone, etc.

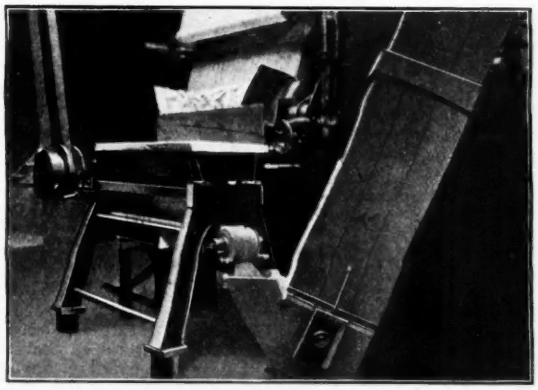
For pulverising many materials, a hammer mill possesses several advantages. (1) It takes a larger piece and crushes it to a finer product than any other single machine. (2) Both the initial and the operating cost of a hammer mill are less than those of various other types of reduction machinery. This is because it is simpler in construction and consumes less power when doing similar work. (3) The K.B. Pulveriser will often handle wet and damp materials, thus eliminating the cost of drying before pulverising.

Structurally, the machine consists essentially of a large outer steel casing, lined with renewable manganese steel plates within which U-type hammers are suspended from a central shaft. These are whirled round, and catching the material fed into the machine, shatter it with great force against a breaking block. This is made of Allen's Imperial Manganese Steel, and is renewable. The rebounding fragments are swept down, and if they are of a size that will pass through the screens, they are rapidly discharged from the machine. If, however, some of the fragments are too large, they are swept on and again shattered against the breaking block. The hammers when worn can easily be moved out to their original length of throw, by means of an eccentric pin adjustment. The breaking block is also adjustable, so that the distance between it and the hammers can be kept constant, and thus the quality of the product from the machine can be kept up to standard.

K.B. Pulverisers are made in various sizes and can be supplied in portable form on steel trolleys, direct driven by electric motor, if desired.

Wolfe Keene and Co.

The present-day tendency to speed up manufacture to make processes continuous finds no better example than in modern industrial filter plants. Wolfe Keene and Co., filtration engineers, Hull, have been pioneers in this field, and their patent specialities include numerous types of continuous rotary vacuum filters and rotary pressure leaf filters covering the most advanced practice in filtration in the chemical



CAKE OF ORGANIC MATERIAL NOTORIOUSLY DIFFICULT TO FILTER BEING AUTOMATICALLY RELEASED, SIEVED, CONVEYED AND ELEVATED TO CONTINUOUS DRYING PLANT BY A WOLFE KEENE FILTER, CONSTRUCTED MAINLY OF FIRTH'S " STAYBRITE " STEEL.

industry. Anti-corrosive materials of every description are used in filter construction, more particularly "Staybrite" steel and Monel metal, from which materials some large and important contracts have recently been carried out. Filtration processes in the oil, solvents, sugar, viscose and mining industries are also catered for. Other plants made are continuous thickeners of the vacuum or high pressure type. The principal characteristics of their more recent development—the rotary pressure leaf filter—are perfect cleansing operation, removal of the filter leaves, flexibility of control, and removal of extraneous matter in either sludge or cake form, whichever is preferred. These machines are made in various sizes and have a filtering capacity up to 1,000 sq. ft. total area. A range of dry vacuum pumps of the compact high efficiency double acting type and also centrifugal pumps of special design, are among other products made and the manufacture of combination thickening, filtering, washing, and drying plant is undertaken in its entirety. In the interests of prospective clients, a complete plant is available for conducting filtration tests on either an industrial or experimental scale at the company's works laboratory.

John Kilner and Sons

The business of John Kilner and Sons (1927), Ltd., Calder Vale Glass Works, Wakefield, was established more than 60 years ago. The firm has manufactured bottles of almost every description and especially for the chemical and drug industries. Productions range from large capacity glass carboys and winchesters to small blue and pale green bottles for poisons. Some of the largest users of glass bottles in this country are included in the clientele, and the company has a good name for goods of excellent quality produced by workmen of the best Yorkshire type.

Leeds and Bradford Boiler Co., Ltd.

The Leeds and Bradford Boiler Co., Ltd., has been established for 55 years, but their title is now somewhat of a misnomer, as they have long since ceased to make steam boilers. At present they manufacture all kinds of plant made of mild steel plates used in chemical and by-product works, their specialities being tar stills, of which they have made many hundreds, and complete tar distilling plants, benzol rectification stills and condensers, impregnating plants for timber and electrical apparatus, vulcanisers for the rubber and tyre trade, autoclaves and vacuum dryers, vertical and horizontal mixing machines, jacketed pans, scrubbers, coolers, heat exchangers, digesters, degreasers, in fact almost any type of vessel made of steel plates of either riveted or welded construction.

The company's works have been recently overhauled and are well equipped with modern machinery, electric welding plants and lifting appliances. They have their own hydraulic presses with a large assortment of press dies, so that they are able to make every part of their products in their own works. They employ only skilled boilermakers, many of whom have been with the firm for 30 years and more, whilst the management has been in the same hands since formation. Many large contracts have been executed for by-product plant, complete tar distilling plant and complete creosoting and impreganting plants, but the firm gives equal attention to smaller orders.

John W. Leitch and Co., Ltd.

John W. Leitch and Co., Ltd., Milnsbridge Chemical Works, near Huddersfield, was established in 1890 by the late Mr. John W. Leitch, B.Sc., for the manufacture of coal tar derivatives used in the preparation of aniline dyes and explosives. They were the first makers of T.N.T. in this country, having commenced the manufacture of this product in 1902, and they supplied enormous quantities to the British Government from the outbreak of war in 1914 until 1917. Since the middle of 1917 the company has made rapid strides in the extension of its pre-war manufacture of intermediate products for aniline dye making, and has also introduced a considerable number of aniline dyes, many of which were not previously made in this country. Special mention might be made of its fine range of fast pigment colours and dyes for lakes, and fast bases for use with naphthol products in calico printing, etc. An important range of colours for rubber is also being produced, under the trade name of "Rubbakol" colours. Several important patents have been taken out, including processes for the application of their azoic colours to wool and silk without the use of caustic alkali, for which the company is prepared to grant licences to the purchasers of their bases.

Oxley Engineering Co., Ltd.

It is now fully recognised by chemical manufacturers that plant of all descriptions can be made by the electric welding process which they have hitherto been unable to procure except in very costly and clumsy design. The Oxley Engineering Co., Ltd., Leeds, have made a speciality of manufacturing every kind of chemical plant in welded construction with complete success. Plant for tar distilleries, and for the manufacture of coal gas and by-products, has been almost revolutionised by the adoption of the "welded design." The welded method of construction can be adapted to almost any design, particularly in mild steel and stainless steel. The experimental stages of welding have long since been passed, and it is now being used with absolute success for all classes of work.

J. Preston, Ltd.

The firm of J. Preston, Ltd., wholesale chemists and laboratory furnishers, of Sheffield, was established in 1830 at 4, High Street, Sheffield, and, like many other firms, was originally a chemist and druggist's business. As Cubley and Preston, the business in laboratory materials was commenced some fifty or sixty years ago, and at the same time the firm had a wide reputation as dealers and manufacturers of photographic goods. To-day, the firm owns its own commodious premises at 208, West Street, and was in 1926 converted into a private limited company. It is looked upon as a specialist in dealing with the equipment of laboratories for steelworks and coke ovens. In addition to this work, it has a large connection with universities and other educational authorities.

F. Robinson and Co.

F. Robinson and Co., Ltd., manufacturers of all kinds of metal containers, have a number of patents applicable to their packages. One of their lines much appreciated by paint manufacturers is a special colour clip which can be attached quite easily to lever tins, and obviates the necessity of carrying large stocks of decorated tins for each of the many colours packed by paint manufacturers. A special form of tin, the T.B., having a wide opening with tightly fitting lever lid and smooth opening, has now been on the market for several years, and is being produced in very large quantities.

The most recent and one of the most promising patents takes the form of an entirely new type of steel keg having a full opening and lever lid. This package, the P.T.L. keg, is being made in all standard sizes, and has been received very well indeed. The P.T.L. keg is light, but on account of its strength is quite suitable for export. The bail handle, as fitted to the smaller sizes, makes the P.T.L. keg a most useful package, and is much appreciated by the buyer of the contents.

In addition to these and other patents, the half T.B. tin, the Special Stripband tin, etc., the firm make all the usual types of plain and decorated canisters, drums, kegs, tapers and steel barrels.

Yorkshire Tar Distillers, Ltd.

The Yorkshire Tar Distillers, Ltd., of Quebec House, Leeds, who have, since the autumn of 1926, been operating one of the largest co-operative tar schemes in the country, have during the past year undertaken an extensive research into the problem of road tars. Besides investigating the question of the most suitable grade of tar for each class of road, they have this year extended their activities to include road tar spraying, and have sprayed large areas in the West Riding of Yorkshire. This branch of their business is to be developed very considerably next year, in furtherance of their intention to eliminate as rapidly as possible the old fashioned method of delivering tar on to the roads in barrels.

The large amount of information gathered from the company's research work cannot fail to be of interest to road engineers in the future, and will be gladly placed at their disposal upon request.

G. W. Storry and Co., Ltd.

Established in 1874 in the centre of the Oil Milling industry, G. W. Storry and Co., Ltd., of Wincolmlee, Hull, have been connected with packages of all types for a matter of 56 years, and for the past 25 years, since welded steel packages came into being, they have specialised in steel containers. Recently the 45 gallon and 90 gallon drums have become the popular packages in the larger types, and Storrys have always been able to supply a first class article at a competitive price. In addition, they are now marketing smaller drums from 1 gallon capacity upwards, their range including all types.

James Wilkinson and Son, Ltd.

James Wilkinson and Son, Ltd., of Tinsley Park Road Sheffield, are well known manufacturers of hydrofluoric acid and fluorides, and of etching acid for the decorative glass industry. They have specialised in pure acids for use in the preparation of B.P. and alimentation products and their A.R. acids for laboratory use have obtained a high reputation throughout the steel industry. The same attention is given to the manufacture of their Brimstone electrical acid, and other products which during 60 years have helped this firm to maintain a tradition of consistent high quality.

J. B. Wilkinson

The firm of J. B. Wilkinson, Dudley Hill Chemical Works, Bradford, has been established for nearly 50 years; it was founded in 1882 by the late Mr. J. B. Wilkinson, and is carried on by his sons. It manufactures on a large scale sulphite of soda in crystals and anhydrous powder form; bisulphite of soda in liquid, powder and crystal form; sodium hydrosulphite powder, zinc sulphoxylate and stripping powder, sodium sulphide, concentrated and crystals, sulphonated and oleine oils, and many other products specially applicable to the textile, bleaching and tanning industries. The firm specialises in products required particularly for cotton, wool, silk or artificial silk fibres.

By-Product Plant Fire

A FIRE broke out at the by-product plant of the Clay Cross Co.'s Ironworks, Derbyshire, this week, and as the portion involved included the naphthalene distillation plant, the flames quickly got a strong hold and extended for a considerable area. Immediately after the fire started the shed containing the spirit was blown up. A quantity of slack coal from the adjoining pit became involved, and coal trucks which were in the path of the flames were burnt. Fortunately a strong wind blew the fire away from an adjoining tar plant, extensive tar-storing tanks, and a gasholder. The building and the distillation plant were destroyed, together with large quantities of naphtha. Many tons of slack coal for use in the coke-ovens were burnt and a portion of the conveying gear, and two electric motors which provided their power, connected with the coke-ovens, were also destroyed.

Rubber from Oil

ACCORDING to Dr. Burgess, director of the United States Bureau of Standards, who has described experiments made by scientists of the Bureau to members of the Inter-American Conference on Agriculture, Forestry and Animal Industry, rubber crystals have been produced from crude petroleum in the laboratories of the Bureau, and if these can be developed the result will be a form of solid rubber, which may have special properties of its own. Dr. Burgess added that the Bureau had examined samples of solid rubber claimed to have been produced in California from crude petroleum, but Government scientists were not yet prepared to pass judgment upon it.

Curtailment of Japanese Superphosphate Output

AT a recent meeting of the association of Japanese superphosphate fertiliser manufacturers, it was decided that the curtailment of 30 per cent. in production should be continued. The annual production of superphosphate fertilisers in Japan is estimated at 1,100,000 tons, which will be reduced to 770,000 tons during the current year. It was also decided at the same meeting that on and after January 1, 1931, the standard weight of a bag of superphosphate should be 37·5 kilos. At present superphosphates are packed in bags of three sizes containing 28 kilos, 37·5 kilos, and 56 kilos.

Trade Publications

Perforated Metals

"PERFORATED METALS" is the title of a singularly well-produced catalogue which has just been issued by G. A. Harvey and Co. (London), Ltd., Greenwich Metal Works, Woolwich Road, London, illustrating the patterns of perforations they are able to produce for purposes of screening, grading, cleaning, sorting, and filtering. In addition to iron and steel, the metals offered include nickel, stainless steel, copper, brass, bronze, monel metal, aluminium, lead, Delta metal, duralumin, zinc, and tinplates. The perforations are round, square, diamond square, slots of various types and placings, stabbed, embossed and ornamental patterns. They are constructed to meet every requirement from the screening and grading of coal, ore and stone to the filtering of fine chemicals. In the majority of cases, catalogue illustrations show the actual sizes of the patterns, and there are notes on patterns which have been evolved for particular industries. At the end of the volume there is a section dealing with revolving screens, straining baskets, filter press plates, gangway plates, and similar products. A copy of the catalogue can be obtained from Harvey and Co., Ltd., on request, and giving details of the purpose for which material is required.

Laboratory Fittings

A revised edition of their catalogue of laboratory fittings, including "Technico" standard unit type benches, has been issued by A. Gallenkamp and Co., Ltd., "Technico House," Finsbury Square, London. It is intended merely as a general guide to customers considering details of new laboratories or extensions, and therefore includes mainly standard fittings, though any kind of fitting can be supplied. A page of useful hints for the layout of the laboratory and conditions governing gas and water services, etc., is given, and there are several photographs of laboratories recently fitted by this firm. Another Gallenkamp publication announces substantial reductions in the prices of Royal Worcester Buchner funnels, varying from 33⅓ to 45 per cent.

Recent publications of Crompton Parkinson, Ltd., Guiseley, Leeds, include folders dealing with their induction motors, "L.S." range, and three inch dial instruments.

The Drayton Regulator and Instrument Co., Ltd., West Drayton, Middlesex, has issued a leaflet dealing with their expansion tank eliminator, which enables a boiler to be fed direct from a water main without the use of an expansion tank.

S. G. Leach and Co., Ltd., 26–30, Artillery Lane, London, E 1, are circulating an abridged list of their exhaust fans, announcing a reduction in price throughout their entire range

Surface Conditions and Heat Transmission

AT the opening meeting for the session of the Institution of Chemical Engineers to be held on Wednesday, October 8, in the Rooms of the Chemical Society, Burlington House, a paper on "The Effect of Surface Conditions on Heat Transmission" will be read by Saral J. Kohli, M.Sc., Ph.D., D.I.C. The author is assistant professor of chemistry in the Maclagan Engineering College, Lahore, and the paper, which is an abridgment of a thesis approved by the University of London for the award of the degree of Ph.D. in Chemical Engineering, describes an original research on the transfer of heat from air to metal tubes, and discusses the variation in the results obtained according to the type of surface of the tube. The surfaces examined include plain polished surface, matt surface, oxidised surface, rough surface, and a number of different coloured enamels. The chair will be taken by the President at 8 p.m.

Yugoslavian Pigment Imports

THE following table shows the more important pigments imported into Yugoslavia during the past two years:—

Commodity	1928 Kilos	1928 Dinars	1929 Kilos	1929 Dinars
Zinc oxide	1,015,733	9,264,581	834,008	7,879,892
Ultramarine	305,335	3,302,034	388,750	4,336,065
Zinc gray, zincelite, lithophone	477,123	3,218,318	520,186	3,024,161
Lead white, red lead, yellow lead	272,187	2,725,704	334,747	3,122,306

Yorkshire Technical Colleges

Chemical Courses at Huddersfield, Bradford and Leeds

Yorkshire's many industries demand a steady flow of technically trained men, and technical education in that county has reached a very high pitch. The following is an account of the chemical and allied courses offered by three of the principal colleges.

Huddersfield

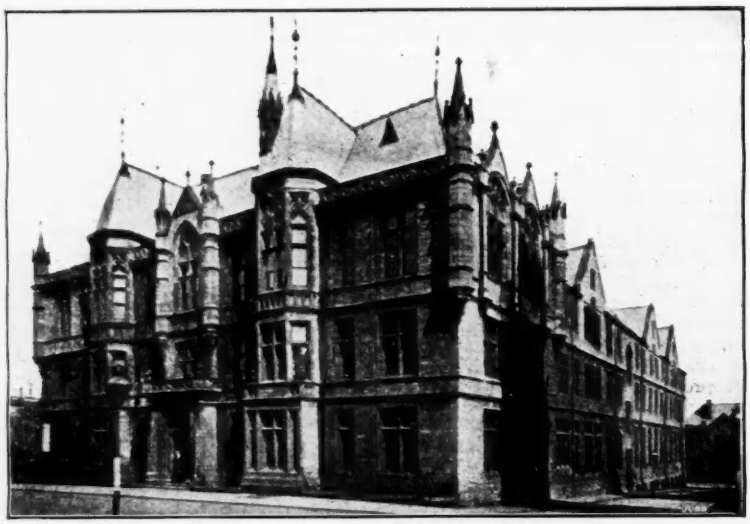
THE Huddersfield district is one of the most important centres of colour manufacture in the world, and it is also universally renowned for its textile and dyeing industries. Accordingly, the courses of the Huddersfield Technical College have been devised to cover the whole range of the related sciences, as well as to provide adequately for those who intend to become chemists in other fields or for those who desire to include general chemistry in their studies for other careers. The complete day course, extending over four years, is recognised by the Institute of Chemistry as a preparation for admission to the examination for the Associateship of the Institute (A.I.C.), and courses are arranged to assist those preparing for the examinations of the Institute in special branches. The classes likewise meet the requirements of the University of London for its science degrees, and of the Royal College of Physicians and Surgeons of London and Scotland for their diplomas.

The day facilities are extended to the evening, where the course, now a minimum of five years and involving attendance on three or four evenings per week, is also recognised by the Institute of Chemistry for the training of candidates for its examinations. Approved students can take up certain special branches of technical chemistry, the following being offered: Gas engineering and supply; gas analysis; chemical engineering; water analysis; chemistry applied to ironfounding; practical metallurgy and assaying; oils, fats and soaps; and chemistry of breadmaking and confectionery.

The work of the Chemistry Department is co-ordinated with that of the independent department of dyeing, which itself is housed in commodious quarters, possesses a fine collection of dyewares, and is well equipped with scientific instruments for the study and technical analysis of dyestuffs, chemicals and textile materials. By the generosity of the late Mr. Samuel Firth, a special laboratory was furnished and equipped for the study of the physical and optical aspects of dyeing problems. The dyehouse is provided with model machines for dyeing loose fibre, yarns or pieces on a large scale, and the material handled is required for, or produced by, the Textile Department of the College. A steady output of research work on dyeing problems has been maintained for several years, and a valuable Research Scholarship given by the Worshipful Company of Drapers is tenable in the Department.

BRADFORD TECHNICAL COLLEGE.

In 1916, a special department of Colour Chemistry was founded to give advanced teaching in the chemistry of the synthetic colouring matters, and of products industrially connected therewith; instruction in the methods of research, and facilities for advanced students to conduct research in the field of colour chemistry. Laboratory instruction embraces the preparation of intermediate compounds (and substances of importance derived from them) and colouring matters, the examination of dyestuffs, and the methods of determining



HUDDERSFIELD TECHNICAL COLLEGE.

the chemical constitution of such substances. Since most of the work involves acquaintance with research methods, instruction in the latter is an essential feature of the practical programme.

The research phase has undergone progressive development since its foundation in 1916, and no fewer than 100 original papers and memoirs have been published in scientific journals of repute. Moreover, five students have recently obtained the Doctor of Philosophy (Ph.D.) Degree of the University of London and others are well advanced with their theses for the doctorate. In addition, six patents have been taken out in connection with researches which appear to be of use to industry. The Head of the Department of Chemistry and Colour Chemistry (Dr. H. H. Hodgson) was awarded the Dyers' Gold Medal for Research three years ago.

The research laboratories of the department are open to graduates (chemistry as principal subject) of any recognised university, to those who have passed an examination of equivalent standard, and to such other students as are able to satisfy the Head of the Department of their ability to conduct research. Valuable research studentships have been founded to enable students to continue their studies after graduation.

Bradford

The training given to those who take a diploma course at Bradford Technical College is not only of high scientific value, but is also valuable from a technical and industrial standpoint. The departments of textile industries, chemistry, dyeing, physics, botany and engineering work are in close association with one another, and in addition to well-equipped laboratories and workshops, the textile industries and dyeing departments make use of machines actually employed in industry. Most of the staff of the different departments have, at some time during their careers, had industrial experience, and, with senior students, they deal with a large number of

technical problems submitted from the textile industries. In consequence of this training students leaving the college are at once of value to employers in industry, a claim that cannot always be made for those who have had only a scientific training. The college staff is constantly engaged in research work, and have published numerous original memoirs, chiefly dealing with chemistry applied to the textile industries.

A scholar leaving a secondary school with the School Leaving Certificate, can enter the Bradford Technical College for a four-year full-time day course of training for a Diploma in chemistry, chemistry and dyeing, or metallurgy. If he has credits in the correct combination of subjects in his School Certificate, so that it is accepted by London University as a Matriculation Certificate, he can read also for the B.Sc. degree (London), and for the examination for the Associateship of the Institute of Chemistry. For any one of the college diplomas, certain engineering courses are compulsory in addition to the subjects of chemistry, physics and mathematics. The student so qualified is, therfore, something more than a chemist. He is, what is so necessary in the works at the present time, a fully-trained chemist with an adequate knowledge of engineering. The department offers facilities for research on pure or applied chemical problems, and a number of research scholarships are awarded to students who desire to do post-graduate work.

For those who, on leaving school, find employment in the chemical and related industries—and these constitute the majority of evening students—and who therefore cannot attend the full-time day courses, there are the part-time evening classes (on three evenings per week), or the day apprentice classes on two evenings and one half-day, usually Saturday morning, per week.

Leeds

A large number of practical courses for both day and evening students are provided in the syllabus of the Department of Chemistry of Leeds Technical College. The college is recognised by the Institute of Chemistry as a training centre for Associateship (A.I.C.), and its day courses give a very thorough course of training, covering practical work in all branches of chemistry, qualitative and quantitative analysis, gas analysis, use of spectroscope and polarimeter, and physico-chemical determinations. The courses are also suitable for students preparing for the B.Sc. Degree of London University. Eevening group courses cover analytical chemistry, metallurgical chemistry, oils and fats, gas engineering and gas supply, dyeing, leather manufacture, optics and a course for pharmaceutical students. Another course during the coming session will deal with the Chemistry of Laundry Work, and will include lectures, practical work in the laboratory and visits to works.

Small Firms and Rationalisation

MR. H. T. TIZARD, Director of the Imperial College of Science, South Kensington, speaking at the annual conference of the Association of Special Libraries and Information Bureaux at New College, Oxford, said :

" Rationalisation of industry is still taken by many people to be synonymous with the absorption of many small concerns by a few large organisations. If that horrid word implies broadly our conscious efforts to procure greater efficiency of production and distribution, the small concerns will go on existing, in this country, at any rate. There are some things that can only be produced and distributed efficiently on a very large scale ; there are others which lend themselves better to scattered production on a small scale. The difficulty which small producing companies are confronted with is that of keeping up to date without a disproportionate expenditure. It is vital that they should co-operate somehow, both in the acquisition of new knowledge and in the application of existing knowledge. In the national as well as international affairs, co-operation is perfectly compatible with independence, and is the ultimate key to industrial progress.

Dyestuffs Advisory Licensing Committee

THE Board of Trade, on the nomination of the Association of British Chemical Manufacturers, have appointed Major L. B. Holliday, of L. B. Holliday and Co., Ltd., Huddersfield, to be a member of the Dyestuffs Advisory Licensing Committee in place of the late Mr. Ernest Hickson.

Key Industries Duties

Renewal of Exemption Orders

THE question of the renewal of the Safeguarding of Industries (Exemption) No. 3 Order, 1929, No. 4 Order, 1929, and No. 1 Order, 1930, made under Section 10 (5) of the Finance Act, 1926, is now under consideration by the Board of Trade. The articles covered by these Orders which exempt them from duty until December 31, 1930, are :—

Acid adipinic ; Acid hydrocyanic anhydrous ; acid lactic which satisfies the requirements of the British Pharmacopœia ; acid oxalic ; amidopyrin (pyramidon ; dimethyl-amidoantipyrine) ; ammonium perchlorate ; barbitone (veronal ; malonal ; malourea ; acid diethyl barbituric ; diethyl-malonylurea ; hypnogen, deba) ; bromural (dormigene) ; celtium oxide ; chinosol ; cocaine, crude ; dial (acid diallyl barbituric) ; dicyandiamide ; didial (ethyl morphine diallyl barbiturate) ; dysprosium oxide ; elbon (cinnamoyl para oxyphenyl urea) ; erbium oxide ; ethylene bromide ; eukodal ; eropium oxide ; furfurol ; gadolinium oxide ; glycol ethers ; guaiacol carbonate (duotal) ; holmium oxide ; hydroquinone ; integrators (planimeter type) ; R. lead acetate ; lead tetra-ethyl ; lipoiodin ; lutecium oxide ; mercury vapour rectifiers ; metaldehyde ; methyl cyclohexanol methyl adipate ; methyl sulphonal (diethylsulphonemethylethylmethane, trional) ; neodymium oxide ; nickel hydroxide ; oxymethyl para-oxyphenyl benzylamine methyl sulphate ; papaverine ; phenacetin (acetparaphenetidine) ; phenazone (antipyrine ; phenyldimethylpyrazolono ; analgesin ; anodynine ; dimethyl oxychinizin) ; phenetidine, para- ; phytin ; piperazine (diethylene-diamine ; dispermin) ; planimeters ; R. potassium chlorate ; potassium ethylxanthogenate (potassium xanthogenate) ; potassium guaiacol sulphonate (thiocol) ; R. potassium hydroxide (R. potassium caustic ; R. potassium hydrate) ; R. potassium permanganate ; praseodymium oxide ; pyramidon-veronal ; quinine ethyl-carbonate ; radium compounds ; resorcine (rescorcinol) ; salol (phenyl salicylate) ; samarium oxide ; stryacol (guaiacol cinnamate) ; sulphonal ; synthalin ; terbium oxide ; thulium oxide ; urea (carbamide) ; vanadium-cilica compounds specially prepared for use as catalysts for sulphuric acid manufacture ; ytterbium oxide ; yttrium oxide.

Section 10 (5) of the Finance Act, 1926, is as follows :—

" The Treasury may by order exempt from the duty imposed by section one of the Safeguarding of Industries Act, 1921, as amended by this Act, for such period as may be specified in the order, any article in respect of which the Board of Trade are satisfied on a representation made by a consumer of that article that the article is not made in any part of His Majesty's Dominions in quantities which are substantial having regard to the consumption of that article for the time being in the United Kingdom, and that thre is no reasonable probability that the article will within a reasonable period be made in His Majesty's Dominions in such substantial quantities."

Communications on this matter should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, within one month from September 24.

Silk Dyeing at Loch Lomond

SIR JOHN GILMOUR, on Saturday, formally opened the British Silk Dyeing Co.'s factory at Loch Lomond, before a large gathering of business men. The company has been formed to carry on the business of weighting, dyeing, and finishing real silk fabrics, which in the past has been carried on almost entirely in France, Switzerland, and Italy. At a luncheon, Sir John Gilmour said that, in introducing the industry to Scotland, the company had no ill-will against such countries as France, Switzerland and Italy, but by developing the business they wished to go hand in hand with their Continental neighbours. Mr. Frank Eastman, a director of the company, said that the waters of 138 rivers, lakes, and lochs in Great Britain, had been tested for the process, and Loch Lomond was the choice. It is expected that when the work is fully in operation between 300 and 400 persons will be employed.

From Week to Week

THE CASTLEFORD EXPLOSION RELIEF FUND, organised by the Urban Council, now totals £8,565.

DR. F. G. BANTING, the discoverer of insulin, underwent an operation at Toronto on Monday for appendicitis. He is reported to be progressing.

THE ENGAGEMENT is announced of Mr. H. U. St. Clair Cunningham, of J. and J. Cunningham, Ltd., chemical manufacturers, Leith, and Miss Jocelyn Guild.

OUT OF A TOTAL of 173 fatal industrial accidents in Great Britain and Northern Ireland, reported during August, 1930, three occurred in the chemical industry.

VACANCIES ARE ANNOUNCED in our advertisement columns for a chemical engineer for works in London and for a qualified chemist with experience in colloids for laboratory work.

AN EXPLOSION and fire occurred on Thursday afternoon at the Wealdstone works of Derby and Co., where cellulose film scrap was treated. The works were badly damaged and one workman seriously injured.

IMPERIAL CHEMICAL INDUSTRIES, LTD., Ardeer Factory, Stevenston, have contributed £300 to the funds of the War Memorial Institute, to provide a public library and reading room for the inhabitants of Stevenston.

MR. WATTS, a partner of the firm of Harley and Watts, Ltd., manufacturing chemists, Crieff, who has been a member of the Town Council for 11 years, has decided to retire from public life. Mr. Watts would have been the next provost of Crieff, and an effort is being made to induce him to continue his public work.

MR. A. J. PACK, the British Commercial Secretary at Washington, who is on a short visit to the United Kingdom, is available at the offices of the Department of Overseas Trade for a few days, for the purpose of interviewing representatives of United Kingdom firms interested in the export of British goods to the United States of America (reference 11,670/30).

AN AUTOMATIC 350 kw. "Mascarini" electrode steam boiler has been ordered from the Bastian Meter Co., Ltd., of Slough, by the Norwich Corporation for their slipper baths and laundry, etc. They are also installing an adjustable hot water circulator with thermostatic control on their existing radiator system to heat their stores. This plant is also being supplied by the Bastian Meter Co.

THE INAUGURAL CEREMONY of the 1930-31 Session of the Sir John Cass Technical Institute, London, will take place on Wednesday, October 8, at 8.15 p.m., when Sir John Gilbert will give an address. After the ceremony, which includes the presentation of students who have gained special successes during the session, 1929-30, the several departments of the institute will be open for inspection.

THE LEA RECORDER CO., LTD., 28, Deansgate, Manchester, announce that they are removing their head office and sales department from 28, Deansgate, Manchester, to new offices adjacent to their Burnside Works. Their new address after September 24 will be: Recorder House, Cornbrook Park Road, Manchester; telephone number, Trafford Park 2077 (three lines); telegraphic and cable address, "Recording, Manchester."

THE DEPARTMENT OF OVERSEAS TRADE states that Mr. T. M. Ainscough, H.M. Senior Trade Commissioner in India and Ceylon, and Mr. W. D. M. Clarke, H.M. Trade Commissioner at Bombay, are anxious to co-operate with visitors from the United Kingdom who are interested in the sale of British-made goods in India. In addition, an officer of the Department of Overseas Trade in London is prepared to discuss details with members of British firms contemplating missions of trade investigation in India.

ACCORDING TO THE *Ministry of Labour Gazette*, the number of insured persons recorded as unemployed in the chemical industry in Great Britain and Northern Ireland at August 25, 1930, was as follows:—chemical, 13,018; explosives, 1,744; paint, varnish, red and white leads, 1,310; oil, glue, soap, ink, matches, etc., 7,212. The figures for Great Britain only were, respectively, 12,803, 1,743, 1,310, 7,158. The percentages of unemployed in Great Britain and Northern Ireland are given as:—chemicals, 12·3; explosives, 9·5; paint, varnish, red and white leads, 6·9; oil, glue, soap, ink, matches, etc., 9·6. For Great Britain only the percentages were 12·2, 9·5, 6·9, 9·6.

AN OUTBREAK OF FIRE during tar-boiling operations at the premises of W. P. Alexander and Sons, of Dundee, caused damage estimated at £200.

THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH has made a senior research award for a period of three years, and of the value of £300 to £350, to Mr. E. A. Stewardson, of the Department of Physics in the University of Liverpool.

ARTIFICIAL SILK PRODUCING COMPANIES associated with the Glanzstoff concern at Elberfeld have agreed to establish united sales organisations at Prague and Vienna. The aim of the agreement is to eliminate internal competition and to stabilise prices.

THE PUBLIC HEALTH COMMITTEE of Aberdeen County Council have decided to recommend the Council to grant an application by the Dundas Chemical Works, Dumfries, for permission to establish a chemical works and knackery at Cottown Croft, Kintore.

AN INTERNATIONAL EXHIBITION OF INVENTIONS, arranged by the Institute of Patentees (Inc.), is to be opened on October 1 at Central Hall, Westminster, London. The exhibition, which will contain a number of the latest inventions as well as exhibits awaiting development, will be open daily from 10 a.m. to 10 p.m. until October 11.

THE ROYAL TECHNICAL COLLEGE, Glasgow, which caters mainly for those who wish to qualify for an industrial career, has just published a comprehensive calendar for the Session 1930-31, giving particulars of day and evening courses in a variety of subjects, including chemistry and technical chemistry, metallurgy, bacteriology and botany, textile manufacture, and pharmacy.

THE EMPIRE ECONOMIC UNION, of which Lord Melchett is the president, has prepared an exhaustive report on the development of inter-imperial trade. This report will be sent to the delegates to the Imperial Conference, and will be published shortly. The report will be a much more definite document than others that have recently appeared, and will contain important and detailed recommendations.

OWING TO THE SUCCESS that has attended the efforts of the Birmingham Tame and Rea Drainage Board in producing gas from sewage sludge, it has now been decided to proceed with a scheme prepared by the engineer, Mr. H. C. Whitehead, comprising heated sludge digestion tanks, pumping plant to enable sedimentation tanks to be cleansed more efficiently than at present, and provision for electric power and light for the whole of the works from the gas produced during digestion of the sludge. The estimated cost of these proposals is £30,500.

THE TOTAL NUMBER OF CASES of poisoning, anthrax, and epitheliomatous and chrome ulceration in Great Britain and Northern Ireland reported during August, 1930, under the Factory and Workshop Act, or under the Lead Paint (Protection against Poisoning) Act, was 36. Eight deaths occurred, five due to lead poisoning and three due to epitheliomatous ulceration. One case of aniline poisoning is reported; 14 cases of epitheliomatous ulceration among pitch, tar and oil workers, and one case of chrome ulceration in the chrome plating industry.

THE OPENING MEETING of the winter session of the London Section of the Society of Dyers and Colourists has been arranged for Friday, October 24, at 6.45 p.m. at the Dyers' Hall, Dowgate Hill, London, when Dr. E. F. Armstrong will deliver a lecture on "The Future of the Dyestuff Industry—Have We Fought in Vain?" In view of the present situation in the dyestuffs industry the lecture is expected to make a wide appeal, and as accommodation will be limited application for tickets should be made to Mr. J. Blair, c/o 40, Southwark Street, London, S.E.1.

AN IMPORTANT TECHNICAL REPORT of the Iron and Steel Industrial Research Council, entitled "Coke for Blast Furnaces," by R. A. Mott and R. V. Wheeler, is to be published by the Colliery Guardian Co., Ltd., early in October. The book, which is the first report of the Midland Coke Research Committee, records the results of the work of a committee composed mainly of representatives of the coke users and coke producers, and is based on large-scale and laboratory tests made at coke-ovens and blast furnaces and on research work carried out in the Department of Fuel Technology of Sheffield University. The price of the book is 25s.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

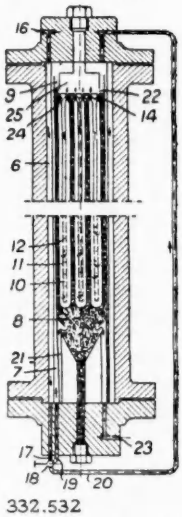
332,489. PRESERVING INDIARUBBER. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. Assignees of S. I. Strickhouser, 318, Lafayette Avenue, Passaic, U.S.A. International Convention date, November 26, 1928.

A rubber mixture is mixed before vulcanisation with 0·5 per cent. of an α-diketone such as benzil, phenanthraquinone, to prevent cracking of the rubber on exposure to air and light.

332,504. BISMUTH HYDROXIDE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on Main, Germany. International Convention date, December 3, 1928.

Bismuth hydroxide for medicinal purposes is obtained by treating an aqueous solution of a bismuth salt with ammonia, filtering, and treating the precipitate with a solvent more volatile than, and soluble in, water, such as alcohol, methanol or acetone, and then washing the precipitate with a second volatile solvent such as ether, ethyl chloride or chloroform.

332,532. CATALYTIC PRODUCTION OF AMMONIA. O. Piette, 100, Avenue de la Toison d'Or, Brussels, and Union Chimique Belge, Soc. Anon., 61, Avenue Louise, Brussels. Application date, April 12, 1929.



332.532

The gas passes through an inlet 16 to a chamber 6, and then to valve 18, which distributes it adjustably between tubes 19 and 20. The gas passes through tube 20 over an electric resistance 9 to a chamber 25. Gas passes also through tube 19 to chamber 7 surrounding the outlet 21 from the catalyst chamber, and thence to chamber 25. The gas mixture then passes downwards through tubes 10 and then progressively through openings 12 into the inner tubes 11, after which it passes downwards through the catalyst in the chamber 8 to the outlet 23.

332,545. DYEING PROCESSES. Imperial Chemical Industries, Ltd., Millbank, London, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 19, 1929.

Viscose silk is dyed in level shades ranging from orange and red to bluish-violet and blue by the use of secondary disazo dyes of the type monamine of the benzine series not containing a nitro group → (alkaline), an amino-naphthol sulphonic acid → end component. Certain dyestuffs which are specified are excluded. In an example, viscose silk is dyed violet brown with the dyestuff *p*-chloraniline → (alkaline) 2:8:6-aminonaphthol sulphonic acid → (alkaline) 2:8:6-aminonaphthol sulphonic acid, Glauber salt, and soda ash.

332,557. COLLOIDAL SOLUTIONS AND PASTES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 22, 1929.

Dyes, pigments, etc., are dispersed in solutions in organic solvents of the polymerisation products of butadiene or its homologues containing alkyl radicles in the 1- or 1:4- positions, or derivatives of these products obtained by the action of an alkali metal, and the products obtained from these by replacing the alkali metal by a carboxyl or other group. Other substances may be added, such as polymerisation products of isoprene or 2:3-dimethyl-butadiene, indiarubber, or its conversion products. The products are used as coating compositions.

332,560. DYES AND INTERMEDIATES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 22, 1929.

An α- or β-halogen ethyl benzene is treated with a primary or secondary aromatic amine, the secondary or tertiary amine produced, or a sulphonic acid derivative thereof, is condensed with an aromatic aldehyde, ketone or hydrol, or with formaldehyde and an aromatic tertiary amine, and any resulting leuco compound is oxidised to the dyestuff. The amines produced by condensing 2 molecules of ethyl aniline with 1 molecule of β-chlor-ethyl-benzene of 2 molecules of *o*-toluidine with 1 molecule of α-chlor-ethyl benzene or the sulphonic acid derivatives may be used. In an example, 1 molecule of Michler's ketone and 1 molecule of ethyl- (α-methyl-benzyl)-aniline are melted with phosphorus oxychloride. Some other examples are given.

332,571. HYDROGEN. C. F. R. Harrison, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, April 19, 1929.

Coke is heated to 1,500° C. by blowing with air, and methane is then blown in till the temperature falls to 1,100° C. with production of hydrogen and carbon. Steam is then blown in till the temperature falls to 900° C. with production of water gas from which hydrogen is obtained by reaction with steam. The methane required may be obtained by the destructive hydrogenation of coal. The process is a cyclic one.

332,579. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 23, 1929. Addition to 308,617.

In the process described in Specification No. 308,617 (see THE CHEMICAL AGE, Vol. XX, p. 523), bromo- 3:4:8:9-dibenzpyrene-5:10-quinones are used as starting materials, and the vat dyes produced may be converted into other vat dyes by treating with cold acid condensing agents such as sulphuric acid, chlor-sulphonic acid or aluminium chloride. In an example, dibrom-3:4:8:9-dibenzpyrene-5:10-quinone is condensed with 1-amino-anthraquinone in the presence of naphthalene, calcined sodium carbonate and copper oxide. The product may be fused with aluminium chloride. The 1-amino-anthraquinone may be replaced by 1:5-diamino- or 1-amino-5-benzoyl-amino-anthraquinone. Other examples are given.

332,584. METAL CARBAMATES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 20, 1929.

Metal carbamates are obtained by treating a solution or suspension of a metal compound such as sodium chloride, calcium chloride or hydroxide, with ammonium carbamate, in an inert liquid solvent such as ethyl or methyl alcohol, formamide, or liquid ammonia which may contain ammonium nitrate or water.

332,605. VINYL ETHERS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 22, 1929.

Vinyl mono-halides or homologues containing at least one hydrogen atom connected to the carbon atom of the

double bond which is free from halogen are treated with aliphatic, cyclo-aliphatic or aliphatic-aromatic alcoholates or phenolates in the presence of organic diluents, preferably alcohols corresponding to the alcoholates employed, or phenols. The reaction may be effected under atmospheric pressure or in a closed apparatus, or under pressure of methane, nitrogen or hydrogen. Examples are given of the preparation of vinyl-ethyl-ether, vinyl-methyl-ether, vinyl-butyl-ether, vinyl-phenyl-ether, vinyl-*o*-cresyl-ether, vinyl-*m*-cresyl-ether, vinyl-α-naphthyl-ether, vinyl-β-naphthyl-ether, ethyl-iso-propenyl-ether, ethyl-1:2-dimethyl-vinyl-ether. The last mentioned is prepared from 2-chlor--β-butylene obtained from 2-chlor-dibutane by splitting off hydrogen chloride by alcoholic potash.

332,623. Condensation Products Containing Nitrogen. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 22, 1929.

Unsaturated hydrocarbons or aldehydes and ammonia or aliphatic or aromatic amines are passed, together with steam, at 300° to 500° C. and a pressure of 1 to 20 atmospheres over catalysts consisting of compounds of the 2nd to 7th groups, the velocity of flow being at least 10 litres of unsaturated hydrocarbon and/or aldehyde per hour per litre of catalyst. Suitable catalysts include bauxite, finely divided oxides of cadmium, aluminium, thorium, zirconium, tin, vanadium, bismuth, molybdenum or tungsten, or mixtures of these with cadmium, lead, tin, antimony or bismuth. In an example, a mixture of acetylene, aniline and steam is passed at 350° C. over silica gel containing zinc oxide, to obtain a 75 per cent. yield of quinoline bases. Several other examples are given. The products are suitable for use as solvents, as denaturing agents for alcohol, and for destroying pests.

332,627. Extracting Rhenium. Siemens und Halske Akt.-Ges., Siemensstadt, Berlin. International Convention date, November 22, 1928.

Minerals such as columbite, gadolinite, or magnetic pyrites, are dissolved in hydrochloric acid and the sulphides precipitated with hydrogen sulphide. In the case of magnetic pyrites containing 0·0001 per cent. of rhenium the precipitate may contain arsenic, molybdenum and rhenium only. The sulphides are then dissolved in nitric acid, and constituents other than rhenium precipitated with ammonium nitrate and phosphoric acid. This is repeated several times, and when the rhenium is sufficiently concentrated it may be recovered by fractional sublimation, reduction of the sulphide concentrate by hydrogen, oxidation in oxygen, reduction, fractional volatilisation, and reoxidation.

332,635. Acetaldehyde. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 22, 1929.

Acetylene and steam are passed over aluminium oxide activated by one or more dehydrating catalysts such as cadmium or zinc oxides or sulphides, or their mixtures with chromates, tungstates, or molybdates, or anhydrides of these acids, *e.g.*, $ZnO.WO_3$, $ZnO.MoO_3$, cadmium molybdate, or zinc tungstate, phosphate or chromate. The temperature should be 150°–500° C., and the acetylene may be concentrated, or diluted with hydrogen, nitrogen, ethylene or carbon dioxide. A number of examples are given of suitable catalysts, and a yield of acetaldehyde corresponding to 90 per cent. of the acetylene may be obtained.

332,639. Phosphate Fertilisers. W. W. Triggs, London. From Armour Fertiliser Works, 111, West Jackson Boulevard, Chicago. Application date, April 25, 1929.

Ground phosphate rock, with added silica if necessary, is calcined with potassium salt or carbonaceous material. The product is treated in an autoclave with ammonia solution and carbon dioxide, or with ammonium carbonate to obtain calcium carbonate and a solution containing potassium and ammonium phosphates which may then be crystallised. The reaction may be accelerated by adding 10–25 per cent. of finely divided clay, feldspar, greensand, alumite, or alumina. In this case the residue may be washed to recover ammonia, and burnt and ground to form a cement.

332,731. Acetylene. R. M. Winter, P. H. Hull, and J. Ferguson, Norton Hall, The Green, Norton-on Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, July 12, 1929.

A mixture of methane or gases containing it, with oxygen or air, is passed through a silica tube heated externally to 1,000° C. A high proportion of oxygen is used, and hydrogen may also be present. Lighting back is prevented by a gauze or other packing in the path of the gas.

332,750. Treating Phosphates. A. Holz, 18, Sherman Place, Irvington, N.J., U.S.A., and T. van D. Berdell, 39, Broadway, New York. Application date, July 30, 1929.

Crude phosphate or material containing tricalcium phosphate is treated with sulphuric acid, and the calcium sulphate treated with ammonium carbonate (or potassium carbonate), or ammonia and carbon dioxide, under increased temperature and pressure, to obtain calcium carbonate and ammonium sulphate. The phosphoric acid solution also obtained is treated with about one-third of the calcium carbonate to obtain dicalcium phosphate, which is mixed with the ammonium or potassium sulphate and evaporated to dryness to obtain a fertiliser.

332,756. Ethers. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. Application date, August 1, 1929.

Aliphatic alcohols containing at least two carbon atoms in the molecule are heated under pressure to a temperature preferably below 300° C., in the presence of a dehydration catalyst such as aluminium oxide or sulphate, or thorium oxide. The issuing gases are condensed. Examples are given of the production of diethyl ether, dipropyl ether, di-isopropyl ether, dibutyl ether, and di-isobutyl ether from the corresponding alcohols. The ethers may be used as diluents for nitrocellulose lacquers.

332,762. Isomerising Rubber. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 6, 1929.

Rubber is treated with phosphorus oxyhalides or mixtures with phosphorus halides in the presence of an organic liquid inert to the phosphorus compounds and capable of swelling or dissolving rubber, *e.g.*, benzene. An example is given in which a reddish brown solution is obtained, and is treated with gaseous ammonia till it is a light yellow colour and then evaporated *in vacuo* and washed with water. Thermoplastic products are obtained.

332,764. Preserving Indiarubber. Goodyear Tire and Rubber Co., 1,144, East Market Street, Akron, Ohio, U.S.A. Assignees of J. Teppema, 29, Mayfield Apartment, Twin Oaks, Akron, Ohio, U.S.A. International Convention date, November 26, 1928.

Organic compounds, such as transformer oils, soaps and rubber, are preserved by the addition of the reaction products of formaldehyde, acetaldehyde, butaldehyde, crotonaldehyde or benzaldehyde and β-naphthol.

332,803. Treating Phosphates. F. Uhde, 79, Rathenau-allee, Dortmund, Germany. International Convention date, October 25, 1928.

Alkali or ammonium sulphate is added to raw phosphates treated with nitric acid, and gypsum is precipitated. Magnesium chloride or sulphate is then added, the solution is heated to boiling, and citrate-soluble magnesium or magnesium-ammonium phosphate is precipitated by adding ammonia, or alkali carbonate or hydroxide. The solution, freed from magnesium phosphate, is evaporated to obtain a fertiliser which may contain ammonium nitrate and potassium or ammonium chloride.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—309,865 (Schering Kahlbaum Akt.-Ges.), relating to C-alkylated phenols, see Vol. XX, p. 595; 311,400 (I.G. Farbenindustrie Akt.-Ges.), relating to azo dyestuffs dyeing black tints, see Vol. XXI, p. 34; 312,345 (E. I. Du Pont de Nemours and Co.), relating to catalytic dehydrogenation, see Vol. XXI, p. 90; 313,124 (I.G. Farbenindustrie Akt.-Ges.),

relating to compounds containing active oxygen, see Vol. XXI, p. 136; 314,859 (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij), relating to destructive hydrogenation of coal, see Vol. XXI, p. 224; 315,263 (T. H. Verhave), relating to 2 : 3-butylene-glycol from carbohydrates, see Vol. XXI, p. 244; 315,264 (T. H. Verhave), relating to acetyl methyl carbinol and diacetyl, see Vol. XXI, p. 244; 315,832 (H. T. Bohme Akt.-Ges.), relating to production of esters, see Vol. XXI, p. 294; 316,099 (I.G. Farbenindustrie Akt.-Ges.), relating to vat dyestuffs, see Vol. XXI, p. 294; 316,143 (I.G. Farbenindustrie Akt.-Ges.), relating to hydroxy-1^1 : 8^1-naphthoylene-naphthimidazoles and sulphonic acids, see Vol. XXI, p. 294; 319,356 (Vereinigte Stahlwerke Akt.-Ges.), relating to iron carbonyl, see Vol. XXI, p. 533; 319,365 (Soc. of Chemical Industry in Basle), relating to vat dyestuffs, see Vol. XXI, p. 533.

Specifications Accepted with Date of Application

309,042. Refining mineral oils, brown coal tar oils, tars, waxes, or the like. Oranienburger Chemische Fabrik Akt.-Ges. April 3, 1928.

312,283. Sulphonating higher fatty acids and fatty acid derivatives. Naamlooze Vennootschap Chemische Fabrik Servo, and M. D. Rozenbroek. May 23, 1928.

312,916. Synthesis of hydrocarbon fuels, and cracking and hydrogenation of heavy hydrocarbons, Processes for. J. Mercier. June 2, 1928.

315,312. Condensation products from diolefines and hydrocarbons, Production of. I.G. Farbenindustrie Akt.-Ges. July 11, 1928.

315,397. Glacial acetic acid from dilute acetic acid, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 14, 1928. Addition to 312,173.

318,618. Oxidation of acenaphthene, acenaphthelene, and their substitution products. Selden Co. September 7, 1928.

334,500. Metals from ores, Production of. E. A. A. Gronwall and H. J. H. Nathorst. April 26, 1929.

334,529. Soluble compositions for dyeing and printing, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) May 1, 1929.

334,533. Aliphatic acid anhydrides, Manufacture of. H. Dreyfus. June 1, 1929.

334,526. Purification of sulphur-bearing gases and recovery of sulphates and sulphur. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) March 2, 1929.

332,554. Artificial rubber and rubber substitutes, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) June 5, 1929. Addition to 315,916.

334,564. Urea or products containing the same, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 2, 1929.

334,565. Compounds of the anthraquinone series, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 6, 1929.

334,579. Primary and secondary amines, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 1, 1928. Addition to 306,414.

334,619. Recovery of ammonia from coal gas and like industrial gases containing ammonia. Gas Light and Coke Co., H. Hollings, S. Pexton and W. K. Hutchison. June 11, 1929.

334,656. Aluminium base alloys. Aluminium, Ltd. December 22, 1928.

334,676. Gel, Production of. W. W. Triggs. (*General Zeolite Co.*) July 27, 1929.

334,677. Zeolites, Preparation of. W. W. Triggs. (*General Zeolite Co.*) July 27, 1929.

334,689. Triarylmethane dyes. Imperial Chemical Industries, Ltd., E. H. Rodd and F. L. Sharp. August 19, 1929.

334,692. Anthraquinone carboxylic acids, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) April 11, 1929.

334,700. Naphthalene derivatives, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) August 28, 1929.

334,706. Dyestuffs and intermediate products therefor, Manufacture of. Soc. of Chemical Industry in Basle. November 29, 1928.

334,709. Barium carbonate, Manufacture of. B. Laporte, Ltd., I. E. Weber and V. W. Slater. September 5, 1929.

334,738. Electrolytic recovery of tin in the form of compact plates of any desired thickness from alkaline dyes containing alkaline stannate. Siemens und Halske Akt.-Ges. March 28, 1929. Addition to 286,673.

334,751. White lead, Process and apparatus for making. E. C. Walker. October 11, 1929.

334,754. Azo-dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 12, 1929.

334,761. Reducing the quantity of sulphurous acid gas set free from copper glance on its roasting, Processes of. M. Miyake. October 18, 1929.

334,777. Aluminium alloys. K. Schmidt Ges. August 15, 1929.

334,790. Chemically pure phosphoric acid, Production of. I.G. Farbenindustrie Akt.-Ges. February 20, 1929. Addition to 319,656.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Anglo Persian Oil Co., Ltd., and Birch, S. F. Glycols. 27,975. September 18.

Bader, W., and Finlayson, D. Catalytic processes. 28,131. September 20.

Barrett Co. Distillation of tar. 27,846. September 18. (United States, September 25, 1929.)

Baxter, J. P., Edwards, W. A. M., Imperial Chemical Industries, Ltd., and Winter, R. M Production of valuable compounds from olefine dichlorides. 28,083. September 19.

Brown, J., and Courtaulds, Ltd. Production of ethylidene diacetate. 28,167. September 20.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Soluble preparations of alkaloids. 27,818. September 17.

—— Preserving rubber, etc. 27,960. September 18.

Chemische Fabrik Kalk Ges. Production of carbon disulphide. 28,133. September 20.

Coley, H. E. Manufacture of zinc, etc. 27,925. September 18.

Du Pont de Nemours and Co., E. I. and Imperial Chemical Industries, Ltd. Non-corrosive aqueous solutions of alcohols. 27,743. September 17.

—— Manufacture of trisazo dyes. 27,744. September 17.

—— Manufacture of triazo dyes. 28,082. September 19.

Eaton, M. M., and Pollopas, Ltd. Producing moulded articles from condensation products of urea and formaldehyde. 27,870. September 18.

Ellis, E. G., and Soc. des Usines Chimiques Rhone-Poulenc. Dissolving cellulose acetates. 27,938. September 18.

Goldstein, R. F. Solutions used in dyeing. 28,084. September 19.

Goodyear Tire and Rubber Co. Manufacture of aryl mercaptothiazoles. 27,510. September 15. (United States, November 6, 1929.)

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs insoluble in water. 28,172. September 20.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Polymerisation of diolefines. 27,524. September 15.

—— Working up oxidation products of hydrocarbons. 27,525. September 15.

—— Manufacture of lactates. 27,526. September 15.

—— Manufacture of chrome yellow colouring-matters. 27,527. September 15.

—— Manufacture of impregnating and adhesive masses. 27,528 September 15.

—— Manufacture of adherent coatings. 27,529. September 15.

—— Manufacture of artificial masses. 27,530. September 15.

—— Manufacture of organic compounds containing nitrogen. 27,531. September 15.

—— Manufacture of products containing nitrogen. 27,663. September 16.

—— Manufacture of condensation products. 27,664. September 16.

—— Cellular building-materials. 27,909. September 18.

—— Production of stable suspensions in liquid metal carbonyls. 27,910. September 18.

—— Preserving rubber, etc. 27,960. September 18.

—— Oxidation of hydrocarbons. 28,049. September 19.

I.G. Farbenindustrie Akt.-Ges., and Mond, A. L. Production of asymmetric dichlorethylene. 27,734. September 17.

I.G. Farbenindustrie Akt.-Ges. Manufacture of para-nitroso-amino compounds or paraquinone-oxime-imino compounds of the aromatic series. 27,520. September 15. (Germany, September 14, 1929.)

—— Manufacture of β-hydroxy-derivatives of alkyl-pyridine. 27,947. September 18. (Germany, October 21, 1929.)

Imperial Chemical Industries, Ltd. Priming-composition containing lead peroxide. 27,930. September 18.

—— Solutions used in dyeing. 28,084. September 19.

—— Manufacture of benzol cellulose. 28,085. September 19.

—— Priming-compositions for percussion caps. 28,086. September 19.

—— Means of recording electrical currents. 28,087. September 19.

Kunstdünger-Patent-Verwertungs Akt.-Ges. Production of ammonium phosphate. 28,088. September 19. (Sweden, October 5, 1929.)

Lonza Elektrizitätswerke und Chemische Fabriken Akt.-Ges. Absorbing oxides of nitrogen. 27,521. September 15. (Germany, September 14, 1929.)

—— Manufacture of fertilisers. 27,776. September 17. (Germany, October 14, 1929.)

Oehme, H. Production of carbon disulphide. 28,133. September 20.

Wacker Ges. für Elektrochemische Industrie Ges., Dr. A. Manufacture of alkoxyaldehydes. 27,519. September 15. (Germany, November 25, 1929.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0⅝d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9½d. and 10d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅛d. per lb. nett d/d U.K., discount according to quantity; ground ¼d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3¾d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¼d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6d. to 7½d. per lb. Crude 60's 1s. 4½d. to 2s. per gall. August/December.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 3d. per gall. B.P., 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 7d. to 2s. 10d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 1s. 11d. to 2s. Dark, 1s. 6d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 10d. per gall. Pure, 1s. 11d. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6¼d. to 6⅝d. per gall. Home, 4d. per gall. d/d. Middle oil, 4⅛d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1⅛d. to 1⅜d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8¼d. to 8½d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 11d.. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £3 to £4 per ton. Whizzed, £4 to £5 per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £10 per ton. Purified Crystals, £14 10s. per ton. Flaked, £11 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 6d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8¼d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8¼d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9½d. per lb., in ton lots.

DICHLORANILINE.—1s. 10d. per lb. f.o.r. works.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb. f.o.r. works.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 1d. per lb. ex works.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—4s. 10½d. to 5s. 3d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3½d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 9d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, for ½ to 1-ton lots, delivered, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 6d. to 1s. 6¾d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantify. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb.
BISMUTH CARBONATE.—6s. 6d. per lb.
BISMUTH CITRATE.—6s. 9d. per lb.
BISMUTH SALICYLATE.—6s. 7d. per lb.
BISMUTH SUBNITRATE.—5s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 4s. 4d. per lb.
BISMUTH OXIDE.—8s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. per lb.
BISMUTH SUBGALLATE.—6s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1 cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., in 1 cwt. lots.
CAMPHOR.—Refined flowers, 3s. to 3s. 2d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb., list price. U.S.P., 3s. 3d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 15s. 6d. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb.. levig., 7s. 10d to 7s. 11d per lb.: Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN —3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—89s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125 lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1 cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—10s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—7s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—11s. per lb.
CITRONELLOL.—8s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—9s. 3d. per lb.
GERANIOL (PALMAROSA).—17s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—11s. 6d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—46s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiacol.—12s. to 13s. 9d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.
ANISE OIL.—No supplies available on spot.
BERGAMOT OIL.—10s. per lb.
BOURBON GERANIUM OIL.—17s. 6d. per lb.
CAMPHOR.—Brown, 1s. 9d. per lb.
CANANGA.—Java, 9s. per lb.
CASSIA OIL, 80/85%.—4s. 6d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 5d. per lb., pure, Ceylon, 2s. 3d. per lb., c.i.f. U.K. port.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 25, 1930.

THERE has been a little better inquiry for chemicals in general during the current week and export business has also been a little brighter.

General Chemicals

ACETONE continues firm at £70 10s. to £80 per ton according to quantity, and in steady request.

ACID ACETIC is firm at £36 5s. to £38 5s. per ton for technical 80%, and £37 5s. to £39 5s. for 80% edible according to quantity, delivered buyers' works, and in steady demand.

ACID CITRIC is still slow at about 1s. 6½d. per lb., less 5%.

ACID LACTIC.—£41 to £42 per ton for the 50% by weight pale quality, and in good demand.

ACID OXALIC.—Firm at £30 7s. 6d. to £32 per ton according to quantity, with a steady demand.

ACID TARTARIC.—Still very easy at about 1s. 0½d. per lb., less 5%, with only a small demand.

ALUMINA SULPHATE is firm at £8 to £8 15s. per ton for the 17/18%, iron free quality.

ARSENIC.—Continues firm at about £16 10s. per ton, free on rails at mines.

CREAM OF TARTAR.—87s. 6d. per cwt., ex warehouse London, with a little improved demand.

COPPER SULPHATE.—Steady at about £21 to £21 10s. per ton, free on rails London, and in good request.

FORMALDEHYDE is steady at £32 per ton, ex wharf London, for 40% by volume.

LEAD ACETATE is unchanged at about £40 per ton for white and £39 per ton for brown.

LEAD NITRATE.—Also unchanged at £29 10s. to £30 per ton, and in steady request.

LITHOPONE.—£19 15s. to £23 per ton according to grade and quantity, with a steady demand.

CARBONATE OF POTASH.—£28 to £29 per ton for the 96/98% arsenic free quality.

PERMANGANATE OF POTASH, NEEDLE CRYSTALS B.P.—5½d. per lb. and in good demand.

PRUSSIATE OF POTASH—Continues very firm at £63 10s. to £65 10s. per ton, with a brisk demand.

BICARBONATE OF SODA is firm at 3⅜d. per lb., with usual discounts for contracts and in steady request.

SODA HYPOSULPHITE, COMMERCIAL QUALITY.—£8 10s., and Photographic Crystals £14 15s. per ton.

SULPHIDE OF SODIUM.—£10 5s. to £11 5s. for solid and £11 5s. to £12 5s. per ton for broken, according to quantity, carriage paid.

TARTAR EMETIC.—Steady at about 11s. per lb.

ZINC SULPHATE is unchanged at £12 10s. per ton.

Coal Tar Products

The market for coal tar products still remains very dull. The recent drop in the price of petrol will probably have the effect of reducing prices for benzols and solvents, although, at the time of going to press, no real change has taken place. Cresylic acid and naphthalenes are generally weaker. Prices are as follows :—

MOTOR BENZOL is still quoted at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA remains at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA is quoted at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL is unchanged at 3d. to 3½d. per gallon f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—The 98/100% quality is quoted at 1s. 8d. per gallon, and the dark quality 95/97% at 1s. 6d. per gallon.

NAPHTHALENES are quoted at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH is to be had at a price of 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port.

Nitrogenous Fertilisers

Sulphate of Ammonia.—The market remains unchanged at £7 to £7 5s. per ton f.o.b. U.K. port in single bags for prompt shipment. Forward prices are higher, but there is very little interest in forward positions. *Home.*—There is no change to report.

Nitrate of Soda.—Up to the present there has not been the usual enormous buying of this commodity. Buyers are waiting to see if there is any prospect of a reduction in price before covering their requirements.

Scottish Coal Tar Products

INQUIRIES for pitch are now being received in greater numbers, although actual business continues slow. Other products are quiet with prices steady at to-day's level, excepting motor benzole, which is in good demand.

Cresylic Acid.—The market is restricted, and quotations are unchanged Pale, 99/100%, 1s. 9¼d. to 1s. 10¼d. per gallon; pale, 97/99%, 1s. 8¼d. to 1s. 9¼d. per gallon; dark, 97/99%, 1s. 7¼d. to 1s. 8¼d. per gallon; high boiling, 1s. 9d. to 1s. 11d. per gallon; all f.o.r. makers' works.

Carbolic Sixties.—There is no demand and value is nominal at about 2s. per gallon f.o.r.

Creosote Oil.—A fair volume of business is passing in the better grades. Specification oil, 2¾d. to 3¼d. per gallon; gasworks ordinary, 3¼d. to 3½d per gallon; washed oil, 3d. to 3½d. per gallon, all ex makers' works in buyers' packages.

Coal Tar Pitch.—While orders continue scarce, there is more interest being shown. Value is 45s. to 47s. 6d. per ton f.a.s. Glasgow for export, and about 47s. 6d. per ton ex works for home trade.

Blast Furnace Pitch.—Very few orders are passing, and controlled prices remain at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—There has been a greater turnover during the week. Quotations remain at 3d. to 3½d. per gallon f.o.r. naked.

Blast Furnace Tar.—Without interest at 2¾d. per gallon f.o.r.

Crude Naphtha.—Value is steady at 4d. to 4¼d. per gallon ex makers' works.

Water White Products.—Motor benzol continues in steady demand at 1s. 5½d. to 1s. 6d. per gallon, but naphthas are dull at 1s. 2½d. to 1s. 3½d. per gallon for 90/160 grade, and 1s. to 1s. 1d. per gallon for 90/190 grade, all ex works in bulk.

Latest Oil Prices

LONDON, September 24.—LINSEED OIL closed firm at a net advance of 17s. 6d. to 12s. 6d. per ton. Spot, ex mill, £29 10s.; October, £26 12s. 6d.; October-December, £26 5s.; January-April, £25 5s.; May-August, £24 17s. 6d., naked. RAPE OIL was inactive. Crude extracted, £32 10s.; technical refined, £34, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £26 10s.; refined common edible, £32; deodorised, £34, naked, ex mill. TURPENTINE was quiet and 3d. to 6d. per cwt. lower. American, spot, 35s. 9d.; October-December, 36s.; January-April, 37s. 9d.; Russian, spot, 33s. 6d.

HULL.—LINSEED OIL.—Spot, £27 10s.; September, £27 10s.; October-December, £26 10s.; January-April, £26; May-August, £25 10s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £23 10s.; edible refined and technical, spot, £27; deodorised, spot, £29 per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £24 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £28 10s.; deodorised, spot, £32 10s. per ton. SOYA OIL.—Extracted and crushed, spot, £26 10s.; deodorised, spot, £30 per ton. RAPE OIL.—Crushed-extracted, spot £32 10s.; refined, spot, £34 10s. per ton. TURPENTINE.—Spot, 38s. per cwt. CASTOR OIL and COD OIL unchanged.

South Wales By-Products

SOUTH Wales by-product activities continue to be unsatisfactory. The demand for most products is small and the immediate outlook is not satisfactory. Pitch continues to have a slow market, and, with patent fuel manufacturers buying only for immediate requirements, stocks are well in excess of the demand. Quotations are unchanged. Refined tars have a steady market, with quotations for gasworks and coke oven tar unchanged. Road tar is slow, the call for it being moderate and sporadic. Values are steady round about 13s. per 40-gallon barrel. Heavy naphtha has a small call round about 11d. per gallon, but solvent is in fairly brisk demand round about 1s. 3½d. per gallon. Motor benzol continues to have a good call, but creosote is weak. Patent fuel and coke exports are slightly better. Patent fuel prices for export are as follows: 21s. 6d., ex-ship Cardiff; 20s., ex-ship Newport; 20s. to 21s., ex-ship Swansea. Coke prices are: Best foundry, 35s. to 37s.; good foundry, 27s. 6d. to 32s.; furnace, 21s. to 21s. 6d. Oil imports into Swansea during the four weeks ended September 16 amounted to 11,883,205 gallons.

ROTARY
COMPRESSORS AND VACUUM PUMPS
of British Make

Made in Sizes 6 to 1,200 cub. ft. per minute capacity.

COMPRESSORS for pressures from 4 to 40 lbs. per sq. in.

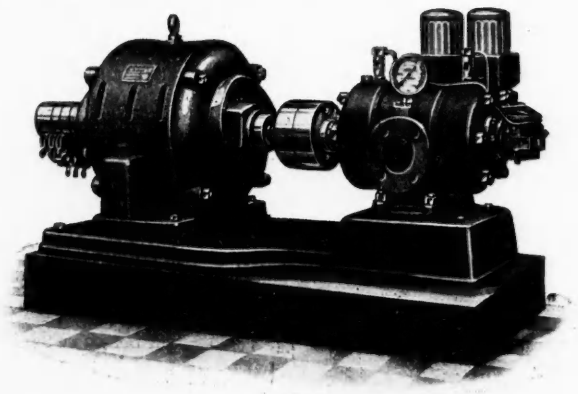
VACUUM PUMPS for vacuums within ·23 in. of barometer.

ABSOLUTE SIMPLICITY

HIGHEST EFFICIENCY

AS a low pressure Compressor or Vacuum Pump, the "Broomwade" Rotary Machine is super-efficient and ideal in all respects. Strikingly simple in design, it is low in first cost and power consumption, of extremely compact dimensions, whilst 10 years' actual experience with many installations of this type has proved it to give lasting and reliable service.

BROOM & WADE LTD.
HIGH WYCOMBE



★

Send for Catalogue "R"

★

BROOMWADE
ROTARY COMPRESSORS & VACUUM PUMPS

F

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, September 23, 1930.

DECIDED improvement is taking place in the Scottish heavy chemical market. Home inquiries are active, and price changes show a definitely rising market.

ACETONE.—B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum 1-ton lots.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1 cwt. bags, delivered free Great Britain in one ton lots and upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3¼d. per lb., ex wharf.

ACID, SULPHURIC.—£3 2s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. 1d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 2½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £32 per ton, ex wharf. On offer for shipment from China at about £31 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material our price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅛d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £26 5s. per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid, buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 2s. per ton, carriage paid, buyer's sidings, minimum six-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices, 55s. per ton, ex works; 57s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, all delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra. Crystals 2s. 6d. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £12 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Claim under a Contract for Oil

Judge and a Notice of Assignment

IN the Shoreditch County Court, on Tuesday, September 23, before Judge Cluer, Sternol, Ltd., Royal London House, Finsbury Square, London, oil manufacturers, sued R. Lenbeck, trading as Lee Auto Services, 2, Burnt Ash Hill, Lee, motor engineers, to recover £7 15s. 6d., damages for breach of contract, dated July 24, 1926, for the purchase of six barrels of Sternol "WW" heavy oil at 4s. a gallon, approximately 40 gallons a barrel. One barrel only was accepted, and they claimed for 240 gallons, £48, less one barrel, 45⅝ gallons, £9 2s. 6d., leaving a balance of £38 17s. 6d., on which they estimated the loss of profit at 20 per cent., the amount they now claimed.

Mr. Percy Gray, an accountant in the employ of the plaintiffs, was asked if his company entered into a contract with the defendant in 1926, but his Honour interrupted by saying, "This accountant knows nothing."

The defendant produced what he described as the contract note.

Judge Cluer read this, and said, "We have this day sold you six barrels of Sternol at 4s. a gallon, on behalf of Sterns, Ltd."

The witness: They are the assignees.

Judge Cluer: Then you must give notice of the assignment in writing.

The witness: It has been in all the papers.

Judge Cluer: That does not matter. I have not got to read all the papers. It is quite enough to pay 2d. for *The Times*. This will have to be heard on some future occasion when you have made up your minds how you are going to proceed under the circumstances.

The defendant: There is also a matter of arbitration.

His Honour: That you can tell me about afterwards. You are not bound to put in a defence, as it is under £20.

KEMET
PURE ACIDS
& CHEMICALS
'KEMET' brand ACIDS
OF EXCEPTIONAL PURITY
AND UNIFORM QUALITY
SULPHURIC ACID, all strengths; Oleum, Monohydrate, Battery Acid, Pure Acids, etc.
HYDROCHLORIC ACID, all strengths; Saltcake, Sodium Sulphate, Glaubers Salts, etc.
LIQUOR AMMONIA, all strengths; Liquor Ammonia Puriss, Sulphate of Ammonia, etc.
ZINC CHLORIDE: Zinc Sulphate, etc.
RED LEAD, and other products.
Those interested in the purchase of acids and heavy chemicals are invited to visit this works by appointment, and see for themselves the modern equipment and the rigorous technical control maintained over all the products.
THE CHEMICAL & METALLURGICAL
CORPORATION LTD., RUNCORN, ENGLAND
Telephone: Runcorn 381. Telegrams: Kemet, Runcorn.
SOLE SELLING AGENTS:
BUSH, BEACH & GENT, Ltd.,
Marlow House, Lloyds Ave., LONDON E.C.
Telephone: Royal 7977. Telegrams: "Beafredma," Fen. London.
BIRMINGHAM OFFICE: 133, Edmund Street,
Telephone 3706. Telegrams: "Beafredma," Birmingham.
FRANK SEGNER & Co., Ltd.,
Yorkshire House, Cross Street, MANCHESTER.
Telephone: Blackfriars 7621. Telegrams: "Segner," Manchester.
THE ILLUSTRATION SHOWS PART OF THE HYDROCHLORIC PLANT.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, September 25, 1930.

In one or two outstanding sections of the chemical market some degree of reaction in prices continues in evidence, but for the most part values keep up pretty well, and on the whole the general position may be described as steadier than it was a month or so ago. In the case of arsenic, the recent firmness has been more than maintained, and higher rates are now being quoted for this material. With regard to business in chemicals during the past week, in some quarters rather more inquiry has been reported, but, generally speaking, trade is still of a patchy character and orders are mainly of small quantities.

Heavy Chemicals

A moderate demand has been experienced for bicarbonate of soda, offers of which are held at round £10 10s. per ton. Buying interest in the case of hyposulphite of soda is of comparatively limited extent, though little quotable change in the price position has occurred, the photographic material offering at about £15 per ton and the commercial at £9 to £9 10s. The demand for phosphate of soda is restricted, and somewhat lower prices are being indicated, the dibasic quality being quoted at about £10 10s. per ton. With regard to caustic soda, values in this section keep up, and a fair trade is going through at from £12 15s. to £14 per ton, in contracts, according to quality. Business in prussiate of soda this week has not been too good, but offers keep up at from 4¾d. to 5¼d. per lb., according to quantity. Alkali is in moderate request, with values unchanged on a contract basis of £6 per ton. A quiet trade is passing in sulphide of sodium at round £8 10s. per ton for the 60/65 per cent. concentrated solid quality and £7 10s. for the commercial grade. Sales of chlorate of soda are of comparatively limited extent, and at about £24 10s. per ton, values are not too strong. Bichromate of soda is steady on the basis of 3⅜d. per lb., less 1 to 3½ per cent., a moderate business being put through. Saltcake is steady at up to £3 per ton, a fair demand being reported.

Caustic potash meets with rather a slow inquiry at the moment, and offers have been made this week at down to £29 per ton. A quietly steady business is being done in carbonate of potash and at about £25 per ton there has been little change on balance in the price position. Yellow prussiate of potash is in moderate request and values are well held at from 6¾d. to 7¼d. per lb. according to quantity. Chlorate of potash is attracting only limited attention but at about £25 10s. per ton, quotations are little changed on the week. Permanganate of potash is slow, but reasonably steady at round 5¾d. per lb. for the B.P. grade and 5¼d. for the commercial. Bichromate of potash keeps up at 4⅛d. per lb., less 1 to 3½ per cent., a moderate amount of business being put through.

A further advance in arsenic has occurred and a fair inquiry is reported; white powdered, Cornish makes, now range from about £17 to £17 5s. per ton at the mines. Continued weakness in the metal tends to restrict business in sulphate of copper, which, however, is still quoted at round £22 per ton, f.o.b. The acetates of lime are easy at about £14 5s. per ton for the grey quality and £7 5s. for the brown, and business this week has been quiet. Nitrate of lead is unchanged at round £29 10s. per ton, as are also the white and brown acetates at £36 and £35.

Acids and Tar Products

Only a quiet demand is reported for tartaric acid, values of which are easy in tendency at 11½d. to 1s. per lb. Citric acid, also, is moving in comparatively small lots at up to 1s. 6¼d. per lb. Acetic acid meets with a moderate demand, and offers are maintained at from £47 to £51 per ton for the glacial material, and round £37 for the 80 per cent. commercial. Oxalic acid is about unchanged at £1 11s. 6d. per cwt., ex store, sales being rather slow.

The demand for pitch is only of moderate extent, with offers at from 45s. to 47s. 6d. per ton, f.o.b. A quiet trade is passing in creosote oil, and values are fairly steady at from 3¼d. to 4⅛d. per gallon, naked, at works. There is a fair inquiry about for carbolic acid crystals at from 6¼d. to 7¼d. per lb., f.o.b., with crude unchanged on the week about 2s. 2d. per gallon, naked. Solvent naphtha is on the quiet side at from 1s. 1½d. to 1s. 2d. per gallon, naked.

Company News

Shawinigan Water and Power Co.—A dividend on the common shares of $⅝ per share for the quarter ended September 30, is announced, payable on October 10.

Boots Pure Drug Co.—An interim dividend at the rate of 24 per cent. per annum, less tax, is announced on the ordinary shares for the quarter, payable on September 30.

Indestructible Paint and Standard Varnish Co.—An interim dividend of 5 per cent. actual, less tax, has been declared on the ordinary shares, payable on October 1.

Rosario Nitrate Co.—The gross profits for the year 1929 amounted to £61,443, but after providing for taxation, interest and other charges, including £47,111 for amortisation of grounds and depreciation of plant, there is a loss of £5,551. This increases the debit balance to £67,556.

Onverwacht Platinum, Ltd.—The report for the year ended June 30, 1930, states that the net profit was £10,540, which with the balance of £5,037 brought in makes £15,577. Government and Provincial taxes absorbed £137, and dividend of 2½ per cent. declared in June, £11,250, leaving a surplus of £4,190 to go forward.

Santa Rita Nitrate Co.—The report for the year ended December 31, 1929, states that stoppage and administration expenses, including loss and depreciation on stores and Chilean income-tax, amounted to £12,567, trading profit, including interest on War Loan, interest and discount and transfer fees, amounted to £5,069, and the difference of £7,497 has been carried to debit of profit and loss account.

Amalgamated Zinc (De Bavay's).—The income for the half-year ended June 30, 1930, which was £9,940, consisted of £6,309 interest earned and £3,631 dividends received. After deducting expenses, the net profit was £6,829, which added to £2,067, the balance of profit the previous half-year, makes £8,896. Since the close of the period dividend No. 47, absorbing £8,000, has been declared payable on October 10, and a further dividend of £2,756 has been received from shares of other companies.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries:—

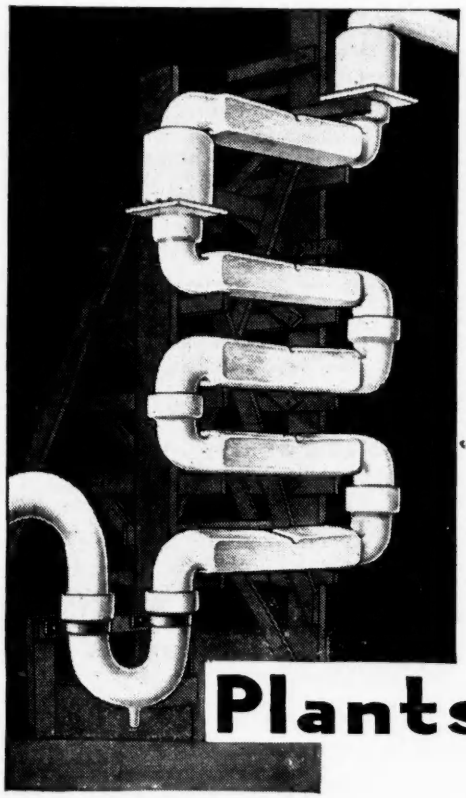
149. (*British Agents Wanted.*)—A United States firm is anxious to get in touch with a British firm capable of undertaking the manufacture under licence of a cleaning compound for industrial uses. Another United States firm is inquiring for a British firm that would act as distributing agents for an industrial soap, and possibly, if the demand justified it, undertake its manufacture under licence.

150. (*Air-Drying Plant.*)—The names are required of firms who can supply suitable air drying plant for a new library in Rangoon. The library is about to be housed in a new building and the books will be kept in open steel racks, in a large room to be known as the "book-stack." In view of the great humidity of the climate of Rangoon during the greater part of the year, books cannot be kept in open shelves unless precautions are taken to dry the air. A schedule showing the conditions under which the books will be kept and also particulars of the size of the "book-stack" has been received, and will be forwarded to firms interested.

151. (*Polishing Compound.*)—An inquirer desires to be put into touch with the makers of "Sempro" for polishing laboratory tables.

152. (*Cast Iron Covers.*)—A correspondent wishes to be informed of the manufacturers of cast-iron manhole covers for earthenware vessels. These covers are clamped over the vessel manhole or top inlet and replace the ordinary wooden covers previously used. They bear the name "Lewis's system."

153. ("*Lurgi*" *Activated Carbon.*)—A London firm requires the name of the manufacturers, or the London agents, of "Lurgi" activated carbon for use in gas absorption plants.



Difficulties Disappear When . . Vitreosil Plants are installed!

THE illustration shows a column of VITREOSIL Absorption Vessels for Hydrochloric Acid Manufacture. This system is economical of ground space, has no submerged joints, and has a high absorption efficiency.

VITREOSIL does not sweat, crack or disintegrate, and being quite unaffected by the acid, gives a water-white product. The plant can be stopped and quickly re-started without damage.

Why not know all about the VITREOSIL System? If your works are in the United Kingdom we will gladly place an advisory expert at your service. May we send you descriptive literature?

Write:
The Thermal Syndicate, Ltd.,
VITREOSIL Works,
Wallsend-on-Tyne.

London Depot:
Thermal House, Old Pye St.,
S.W.1

VITREOSIL
PURE FUSED QUARTZ OR SILICA

The plant that speeds up production and effects economies.

SYSTEM OF HYDROCHLORIC ACID ABSORPTION.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BRITISH ENKA ARTIFICIAL SILK CO., LTD., London, E.C. (M., 27/9/30.) Registered September 3, mortgage (supplemental to Trust Deed dated September 18, 1925, etc., securing £250,000 1st debentures and premium of 6 per cent.); charged on land at Aintree. *£246,900. April 7, 1930.

MALEHURST BARYTES CO., LTD., Shrewsbury. (M., 27/9/30.) Registered September 17, series of £25,000 (not ex.) debentures, present issue £17,000; general charge. *£102,500. November 22, 1929.

Satisfactions

DEARBORN (1923), LTD., London, W.C., manufacturing chemists. (M.S., 27/9/30.) Satisfaction registered September 12, £14,422 10s. 9d., balance of amount registered January 10, 1923.

HEDLEY (THOMAS) AND CO., LTD., Newcastle-on-Tyne, soap manufacturers. (M.S., 27/9/30.) Satisfaction registered September 12, £75,000, registered September 2, 1926.

HOYLE, ROBSON, BARNETT AND CO., LTD. (old company), Newcastle-on-Tyne, paint manufacturers. (M.S., 27/9/30.) Satisfaction registered September 17, £8,500, outstanding July 1, 1908.

Receivership

ALPHA SYNTHETICS, LTD. (R., 27/9/30.) G. D. Cahill, Assistant Accountant, of 50, Finsbury Chambers, Finsbury Pavement, E.C.2, was appointed Receiver and Manager on September 3, 1930, under powers contained in debenture dated July 7, 1930.

London Gazette, &c.

Company Winding Up

HERMOLINE PRODUCTS, LTD. (C.W.U., 27/9/30.) Winding up order, September 18.

Company Winding Up Voluntarily

SCOWEN AND CO., LTD. (C.W.U.V., 27/9/30.) By reason of its liabilities, September 18. W. H. Cork, 19, Eastcheap, London, E.C.3, accountant and auditor, appointed as liquidator and C. P. Percy, B. E. Joseph and G. King, appointed as a Committee of Inspection.

New Companies Registered

PROVENCE OLIVE OIL CO., LTD., 90, Cannon Street, London E.C.4.—Registered September 19. Nominal capital, £1,000 in £1 shares. Importers, exporters and general merchants of olive oil, etc. Directors: N. D. Grundy, S. A. Jones.

EDWARD LORD, LTD.—Registered September 22. Nominal capital, £3,000 in £1 shares. To acquire the business of a tar distiller and chemical manufacturer and merchant now carried on by E. Lord at Chemical Works, Baildon, Yorks. Directors: E. Lord (governing and managing director), Chemical Works, Baildon, W. Lord, J. G. Lord.

FERROCLENE, LTD., Higher Audley Street Works, Blackburn.—Registered September 18. Nominal capital, £100 in £1 shares. Chemical manufacturers, chemists, drysalters, importers and manufacturers of and dealers in chemical, industrial and other preparations and articles, etc. Directors: H. Yates, C. Field, A. Draper.

QUIKHEAT ELECTRICAL CO., LTD.—Registered September 23. Nominal capital, £100 in £1 shares. Manufacturers of and dealers in electrical fires, etc., mechanical, refrigerating and chemical engineers, workers in porcelain, rubber and other insulating materials, etc. A subscriber: D'Arcy F. Cubitt, Amberley House, Norfolk Street, London, W.C.2.

TENNANTS CONSOLIDATED, LTD.—Registered as a "public" company on September 23. Nominal capital £200 in 100 6 per cent. redeemable cumulative preference shares of £1 each and 400 ordinary shares of 5s. each. The objects are to acquire, deal with, and turn to account shares, stocks, etc., and to carry on the business of chemists, druggists, drysalters, importers and manufacturers of and dealers in pharmaceutical, medicinal, industrial and other chemical preparations, etc. A subscriber: P. F. Kinsey, 18, Austin Friars, London, E.C.2.

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to October 17, 1930.

DEGLATOL.

514,726. Class 1. Chemical substances for use as desizing materials in the textile industry. H. Th. Böhme Aktiengesellschaft (a joint stock company organised under the laws of Germany), 29, Moritzstrasse, Chemnitz, Saxony, Germany; manufacturers. July 19, 1930. To be Associated with No. 514,730 (2,738), xlvii.

DEDRESAN.

514,727. Class 1. Chemical substances for use as desizing materials in the textile industry. H. Th. Böhme Aktiengesellschaft (a joint stock company organised under the laws of Germany), 29, Moritzstrasse, Chemnitz, Saxony, Germany; manufacturers. July 19, 1930. To be Associated with No. 514,730 (2,738), xlvii.

DIRIMAL.

514,728. Class 1. Chemical substances for use as desizing materials in the textile industry. H. Th. Böhme Aktiengesellschaft (a joint stock company organised under the laws of Germany), 29, Moritzstrasse, Chemnitz, Saxony, Germany; manufacturers. July 19, 1930. To be Associated with No. 514,730 (2,738), xlvii.

ACORIT.

515,429. Class 1. Chemical substances for steeping, colouring and brightening textile fabrics in the course of manufacture, but not including coal tar colours. H. Th. Böhme Aktiengesellschaft (a joint stock company, organised under the laws of Germany), 29, Moritzstrasse, Chemnitz, Saxony, Germany; manufacturers. July 19, 1930. To be Associated with No. 514,730 (2,738), xlvii.

Tariff Changes

BRITISH INDIA.—Radium and its salts have been exempted from Customs Duty on import.

VENEZUELA.—Bituminous paints for ironwork are to be assigned to Class III of the Venezuelan Tariff, the duty including surtaxes being 0·3914 Bs. per kilog. gross.

Explosives in Coal Mines

THE Secretary for Mines announces that he has made an Order amending the List of "Permitted Explosives" to be used in certain classes of mines, as follows:— (1) The explosive *Celmonite*, manufactured by Cooke's Explosives, Ltd., is added to the list of explosives which have passed the Buxton Test. (2) The explosive *Ammonite No. 1 P*, manufactured by the Miners' Safety Explosive Co., Ltd., previously omitted from the Permitted List owing to a misunderstanding, is restored to the list of explosives which have passed the Rotherham Test. (3) The definitions of certain permitted explosives manufactured in the Union of South Africa are amended, and certain other explosives are removed from the list as no longer manufactured or used. Copies of the Order will shortly be available and may be purchased, price 2d. (by post 2½d.), from H.M. Stationery Office.